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Areawide Environmental Assessment on the Development of a NEPA (National Environmental Policy Act) Compliance Strategy for New Source Coal Mining Activity in the Eastern Kentucky Coal Field

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AREAWIDE ENVIRONMENTAL ASSESSMENT ON THE DEVELOPMENT OF A NEPA COMPLIANCE STRATEGY FOR NEW SOURCE COAL MINING ACTIVITY IN THE EASTERN KENTUCKY COAL FIELD

Prepared for:

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Environmental Assessment Branch
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345 Courtland Street, N.E.
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August 11, 1982

EXECUTIVE SUMMARY

1. Background

In accordance with the National Environmental Policy Act (NEPA), the United States Environmental Protection Agency (USEPA) is required to conduct an environmental review prior to the issuance of each New Source National Pollutant Discharge Elimination System (NPDES) permit for coal mining activities in the Eastern Kentucky Coal Field. New Source coal mining operations refer to all such operations which began construction after 17 September 1977. On that date draft standards of performance for New Sources were published for the coal mining industry. Simultaneously, environmental reviews by USEPA of all New Source NPDES permit applications became mandatory.

The Eastern Kentucky Coal Field Areawide EIA was initiated with the objective of developing a strategy to streamline USEPA's permit review process while fulfilling the legislative requirements of the Clean Water Act and NEPA. The need to streamline the permit review process arises from the existing large volume and projected increase in coal mining permit applications meeting New Source criteria. USEPA Region IV could be faced with as many as 350 permit applications annually for New Source coal mining activities in the Eastern Kentucky Coal Field. The financial and human resources necessary to support the responsibility of reviewing these permit applications utilizing standard procedures are not currently available and do not appear likely to be available in the future.

The strategy development process utilized in order to achieve the objective included the following elements:

- Description of the environmental resources of the Eastern Kentucky Coal Field in order to identify those resources which are sensitive to coal mining activity;
- Description and analysis of the existing and anticipated regulatory framework in eastern Kentucky regarding coal mining activities in order to determine the regulatory constraints with which a NEPA compliance strategy must comply;
- Identification of those resources sensitive to coal mining which are not protected by the existing regulatory framework in whole or in part;

- Development of generalized NEPA compliance strategies;
- Identification and analysis of the various options which could be incorporated into NEPA compliance strategies including resource threshold criteria and standard mitigating measures in the form of permit conditions for identified sensitive resources;
- Development of specific alternative NEPA compliance strategies; and
- Evaluation of those feasible strategies with regard to level of environmental benefit, USEPA resource requirements, costs to the applicant, time frame, and duplication of effort.

The information presented in this Areawide EIA is supported and supplemented by a Technical Reference Document and environmental baseline data illustrated in a Resource Atlas which consists of quadrangle base maps with overlays that display various environmental resources. The Technical Reference Document and Resource Atlas are available for inspection at the Lands Unsuitable for Mining Program Office, Kentucky Department for Natural Resources and Environmental Protection, Frankfort, Kentucky, and at USEPA Region IV in Atlanta, Georgia.

The key feature of EPA's approach to NEPA analyses of coal mine permit applications will be the evaluation of regulatory requirements placed on the coal mining industry by State and Federal agencies, and the evaluation of environmental effects of mine development against Resource Threshold Criteria. State requirements, the requirements of other Federal Agencies and the Threshold Criteria are presented in Section 5.5, Chapter 6 and Appendix A of this report. We suggest that particular attention be paid to these sections of the report.

Also, if additional technical information on surface and underground coal mining is desired, EPA's Environmental Impact Assessment Guidelines on New Source Surface Coal Mines (EPA-130/6-79-005) and New Source Underground Coal Mines and Coal Cleaning Facilities (EPA-130/6-81-002) should be consulted.

2. Study Area Description

The Eastern Kentucky Coal Field encompasses 39 counties and is characterized by rugged terrain and a rural setting. Coal is mined in all but nine of the counties. Pike, Martin, Harlan, Breathitt, Bell, Perry, Knott, Floyd, Letcher, and Leslie Counties are currently the largest producers of coal and are projected to remain so through the end of this century.

The surface water resources of the Coal Field are comprised of five principal watersheds (Little Sandy-Ohio-Tygarts Creek Basin, Licking River Basin, Big Sandy River Basin, Kentucky River Basin, and Upper Cumberland River Basin) which eventually flow into the Ohio River. Water quality varies greatly across the Coal Field with siltation and acid mine drainage from coal mines identified as the principal sources of pollution. Groundwater resources are commonly encountered within the first few tens of feet beneath the ground surface and are the principal source of potable water supply in many regions of the Coal Field.

The biological resources of the Coal Field are comprised of many northern and southern species of flora and fauna. Eastern Kentucky is an overlap zone where many species once ranged, but are now found only in isolated locations. Approximately 23 species of plants and animals are Federally listed as endangered or threatened. The Kentucky Nature Preserves Commission (KNPC) has designated certain environmentally sensitive areas in the Coal Field as High Potential Critical Areas or Known Critical Areas which are especially sensitive to coal mining activities.

Broad expanses of forest area interspersed with agricultural lands in the river valleys and plateau regions characterize the land use pattern of the Coal Field. Urban land uses are concentrated primarily in the northern portions of the region along the Kentucky-Ohio border. Coal mining activities are a major economic land use in the southeastern half of the Coal Field. Prime agricultural land accounts for only 6% of the total area of the Coal Field and generally occurs in wide valley bottoms, the higher terraces, and gently rolling ridges. Recreational land use in the Coal Field is abundant. Five Federal facilities, ten State parks, and other county, local, or private facilities are located within the area.

Overall socioeconomic conditions in the Eastern Kentucky Coal Field have improved markedly during the past several years. The renewed interest in coal has initiated almost a full decade of increased employment and population growth within most of the Coal Field counties. A large part of this growth is a result of in-migration. Attracted by the employment opportunities and the higher wages of the coal mining industry, many new and displaced miners and their families have moved into the towns and settlements of eastern Kentucky. Except in the large cities, the coal mining industry is the primary and almost exclusive economic base for eastern Kentucky.

Cultural resources in the form of historic, archaeologic, and paleontologic sites occur throughout the Coal Field. Altogether, 1,631 known archaeological sites and 357 historic properties in the Coal Field have been mapped by KNPC. These sites represent only a small portion of the cultural resources that may exist in eastern Kentucky because of the lack of systematic cultural resource surveys in the region.

The ambient air quality of the Coal Field is generally in compliance with National Ambient Air Quality Standards (NAAQS). The most extensive air pollutant in eastern Kentucky is particulate matter which is also the major air pollutant emitted from coal mining operations.

Noise levels in the Coal Field are believed to be typical of rural areas. With the increase in coal mining, transportation, and preparation activities, noise levels may become locally intense in some parts of the Coal Field. Coal mining activities are reported to be the major noise source in rural eastern Kentucky.

3. Adverse Environmental Impacts of Mining Activities

Coal mining activities in the Eastern Kentucky Coal Field can potentially result in adverse impacts to the environmental resources of the area. Existing State and Federal regulations are designed to eliminate many of the potential impacts resulting from the mining, transportation, and preparation of coal. USEPA has identified specific resources which are not protected from mining-related impacts by existing State or Federal regulations. These resource areas and associated impacts are as follows:

Surface Water and Aquatic Ecosystems (including threatened or endangered species)	Surface disturbances can adversely affect the water quality of sensitive stream segments causing a reduction, alteration in composition, or elimination of aquatic life and reduction in water use opportunities for domestic consumption or industrial processes.
Groundwater	Contamination of aquifers by acid mine drainage from underground mines or migration of leachates from coal refuse and storage piles at coal preparation plants and dewatering of underground mines can adversely affect the quality and quantity of water at public and private water supply wells.
Terrestrial Ecosystems (Including threatened or endangered species)	Mining can cause elimination or disturbance of identified sensitive plant and animal habitats, and other identified sensitive areas.
Wetlands	Surface mining can result in the direct removal or elimination of wetlands. The introduction of acid mine drainage and sediments into wetlands, changes in the rate and quality of groundwater and surface water inflow, and alteration of soil moisture levels may result in the degradation of wetlands.
Environmentally Significant Agricultural (ESA) Lands	Mining can result in the conversion of prime farmland cultivated at least five of the past ten years, unique farmland, and farmland of statewide or local importance to non-agricultural uses, reducing an already scarce resource in eastern Kentucky.
Recreational Lands	Mining can result in the pollution of recreational lands adjacent to mining operations by noise, degraded water, dust, and/or visual effects.
Historic/Archaeological Sites	Mining operations can alter, destroy, or otherwise affect sites that are eligible for inclusion on the National Register of Historic Places.
Air Quality	Coal transportation by haul trucks on unpaved public roads not within the permit area can result in fugitive dust emissions at sensitive receptors, affecting public health and general welfare.
Noise	Mining operations and coal transportation on public and private haul roads can increase ambient noise levels significantly at sensitive receptors located near the operations or along roads with high volumes of coal truck traffic, thereby affecting the public health and general welfare.

4. Resource Threshold Criteria

In order to simplify the review of possible impacts to the environmental resources of the Eastern Kentucky Coal Field, USEPA developed the concept of Resource Threshold Criteria (RTC). The evaluation of the degree of environmental effect of a proposed mining operation can be measured against the criteria set forth in the RTC. Three basic levels or thresholds (Figure 1) define four categories of environmental effect which result in differing responses by USEPA. Under this concept information needs and permit processing times are dependent upon the significance of impacts caused by the proposed operation. The RTC concept is utilized in several of the NEPA compliance alternatives considered in this document.

5. NEPA Compliance Alternatives

Five NEPA compliance alternatives were selected for final evaluation in this EIS out of approximately 29 alternatives that were initially developed. These five alternatives include the No Action, Individual Review, Areawide Review, Areawide-Individual Combined Review, and Areawide-Subareawide-Individual Combined Review Alternatives. A general description of each alternative follows.

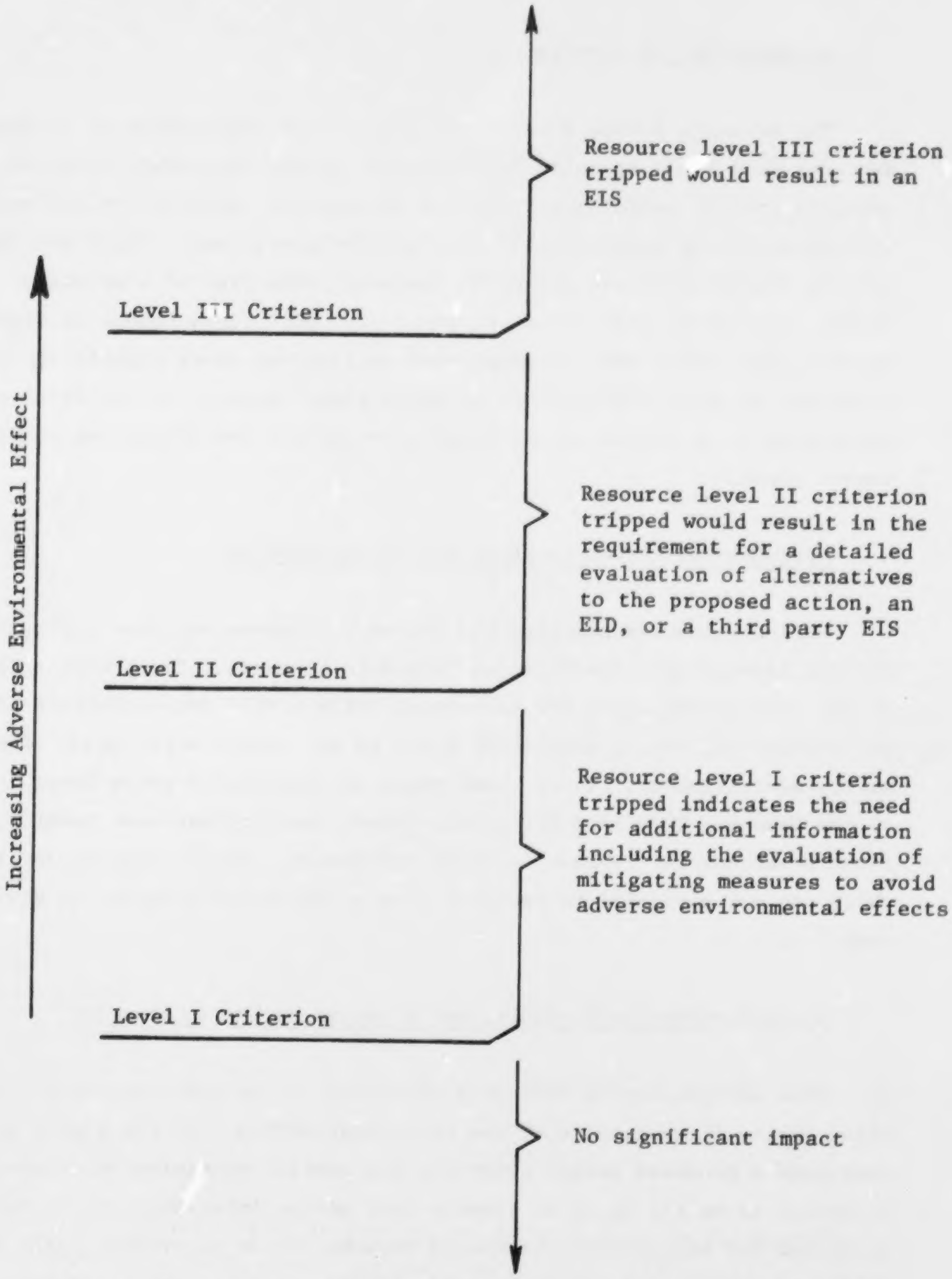
No Action Alternative

This alternative assumes that USEPA Region IV would avoid determining New Sources for the coal industry and would entail the use of NEPA compliance activities only when requested by the applicant or an outside party whether Federal, State, or local. This strategy would result in minimal environmental benefits being realized for the majority of coal operations with some substantial benefits accomplished on those brought to the attention of USEPA.

Individual Review Alternative

Procedurally, this alternative is similar to the existing compliance process used for other new source industry. Individual environmental reviews

Figure 1. The use of Resource Threshold Criteria to determine USEPA permit review actions.


Increasing Adverse Environmental Effect
Level III Criterion
Level II Criterion
Level I Criterion

Resource level III criterion tripped would result in an EIS

Resource level II criterion tripped would result in the requirement for a detailed evaluation of alternatives to the proposed action, an EID, or a third party EIS

Resource level I criterion tripped indicates the need for additional information including the evaluation of mitigating measures to avoid adverse environmental effects

No significant impact

would be conducted for each of the estimated 350 New Source NPDES coal mining applications with FONSI's or EIS's being prepared on a case-by-case basis.

Areawide Review Alternative

The Areawide Review Alternative assumes the preparation of an Eastern Kentucky Coal Field Areawide Environmental Impact Assessment (EIA) and the analysis therein would constitute the substantive analysis for all future actions regarding permitting of coal-related operations. There are three options available to the Agency to implement this type of a strategy. USEPA could: (1) reason that no future action by USEPA would result in significant impacts; (2) reason that although some actions may cause significant impacts, there are no means available to mitigate these impacts; or (3) develop general conditions to be placed on all permits to address the identified significant impact areas.

Areawide-Individual Combined Review Alternative

This alternative combines the latter two approaches into a single strategy and incorporates the Resource Threshold Criteria. The Areawide EIA would be the substantive basis for satisfying USEPA's NEPA responsibility for those New Source coal mining activities which do not create significant adverse environmental impacts (i.e., those which are considered below Level I for each of the Resource Threshold Criteria). Where applications meet Level I, individual environmental reviews would be undertaken. Should significant impacts which are not mitigated be expected from a particular project, an EIS would be prepared.

Areawide-Subareawide-Individual Combined Review Alternative

This alternative is virtually identical to the Areawide-Individual Combined Review Alternative with one additional option. If the region which surrounds a proposed permit area: (1) has similar sensitive resources; (2) is projected to be the focus of intense coal mining interests; or (3) has the potential for significant cumulative impacts on the watershed, USEPA may decide to conduct its own subareawide review prior to permit issuance. This review could ultimately reduce the number of New Sources in the subarea requiring individual analysis by establishing standard mitigative measures for mining activities within its boundaries.

5. Conclusion

Each of the NEPA compliance alternatives and their variations present distinct advantages over the present NEPA compliance process. When analyzed in terms of the level of environmental benefits, manpower requirements, time requirements, financial impacts, and flexibility, however, the Areawide-Subareawide-Individual Combined Review Alternative is the most attractive alternative for meeting USEPA's NEPA requirements. This alternative provides a high level of environmental protection while significantly streamlining the NEPA review process. A moderate manpower requirement of 1.5 manyears would be required by USEPA to implement the review process. This alternative would also satisfy USEPA's statutory responsibilities and would further represent an innovative approach to NEPA compliance based not only on procedural ease but the ability to effect environmental benefits. The Areawide-Subareawide-Individual Combined Review Alternative is the most flexible alternative available to USEPA because it provides a mechanism to significantly expedite permit processing for the non-environmentally significant mining projects. It also provides a means to expend increasing amounts of resources on the review of mining projects which demonstrate the greatest potential for significant adverse environmental impacts.

Since the initial writing of this document, Kentucky has received primacy for implementation and enforcement of the Surface Mining Control and Reclamation Act (SMCRA) requirements. Additionally, there have been numerous revisions to the SMCRA regulations, some of which are final, some of which are undergoing litigation in the courts. The Areawide-Subareawide-Individual Combined Review Alternative and the Resource Threshold Criteria were designed to provide the flexibility necessary to consider changes to existing regulations which may affect the level of protection afforded to identified sensitive resources. Thus although some specific changes are not reflected in this document, provision for their consideration has been built into the review strategy itself.

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LIST OF ACRONYMS AND ABBREVIATIONS

ADD	Area Development District
AMD	Acid Mine Drainage
AQCR	Air Quality Control Region
ARC	Appalachian Regional Commission
ARDA	Appalachian Regional Development Act
ASTM	American Society for Testing and Materials
BACT	Best Available Control Technology
BOD	Biochemical Oxygen Demand
BSMRE	Bureau of Surface Mining Reclamation and Enforcement
BTU	British Thermal Unit
°C	degrees Celcius
CAA	Clean Air Act
CEQ	National Council on Environmental Quality
CFR	Code of Federal Regulations
cfs	cubic feet per second
CMSHA	Coal Mine Health and Safety Act of 1969
CWA	Clean Water Act
dB	decibels
dBA	the sound level measured in decibels (A-scale)
EIA	Environmental Impact Assessment
EID	Environmental Information Document
EIR	Environmental Information Request
EIS	Environmental Impact Statement
EO	Executive Order (of the President)

LIST OF ACRONYMS AND ABBREVIATIONS (CONTINUED)

EPIC	Environmental Photo Interpretation Center
ESA	Environmentally Significant Agricultural land
°F	degrees Fahrenheit
FEMA	Federal Emergency Management Administration
FHA	Federal Housing Administration
FHBM	Flood Hazard Boundary Map
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
FONSI	Finding of No Significant Impact
FWPCA	Federal Water Pollution Control Act
gpd	gallons per day
gpm	gallons per minute
HPCA	High Potential Critical Area
KCA	Kentucky Coal Association
KDHR	Kentucky Department for Human Resources
KDLG	Kentucky Department for Local Government
KDMM	Kentucky Department of Mines and Minerals
KDNREP	Kentucky Department for Natural Resources and Environmental Protection
KDOC	Kentucky Department of Commerce
KDP	Kentucky Delphi Process
kg/MT	kilograms per metric ton
km	kilometer
km^2	square kilometers
KNPC	Kentucky Nature Preserves Commission

LIST OF ACRONYMS AND ABBREVIATIONS (CONTINUED)

KYGS	Kentucky Geological Survey
Leq	the equivalent energy averaged sound level
m	meter
mgd	million gallons per day
mg/l	milligrams per liter
mi^2	square miles
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MSHA	Mine Safety and Health Administration
MT	metric ton
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NHPA	National Historic Preservation Act
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NSPP	New Source Permit Program
NSPS	New Source Performance Standards
ORBES	Ohio River Basin Energy Study
POM	polycyclic organic material
ppm	parts per million
PSD	Prevention of Significant Deterioration
RTC	Resource Threshold Criteria
SCMRO	Surface Coal Mining and Reclamation Operation
SCS	Soil Conservation Service, also listed as USDA-SCS

LIST OF ACRONYMS AND ABBREVIATIONS (CONCLUDED)

SHPO	State Historic Preservation Officer
SIP	State Implementation Plans
SMCRA	Surface Mining Control and Reclamation Act
SMSA	Standard Metropolitan Statistical Areas
sq mi	square mile
STORET	Storage and Retrieval data base system maintained by EPA
T	Ton
TDS	total dissolved solids
TSP	total suspended particulates
TSS	total suspended solids
USBOM	United States Bureau of Mines
USCOE	United States Corps of Engineers
USDA	United States Department of Agriculture
USDOC	United States Department of Commerce
USDOE	United States Department of Energy
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
USHCRS	United States Heritage Conservation and Recreation Service
USHUD	United States Department of Housing and Urban Development
USMSHA	United States Mine Safety and Health Administration, also listed as MSHA
USOSM	United States Office of Surface Mining

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EPIC

Land Use and Land Cover Overlays and Mining Operations Overlay for the Eastern Kentucky Coal Field Environmental Resources and Mining Atlas

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Kentucky Nature Preserves Commission

Eastern Kentucky Coal Field: Preliminary Investigation of Natural Features and Cultural Resources

Volume I:	Donald F. Harker, Jr., Dr. Loy R. Phillippe, Richard R. Hanson, Ronald S. Caldwell, Max E. Medley, Wayne C. Houtcooper
Volume II:	Donald F. Harker, Jr., Dr. Loy R. Phillippe, Richard R. Hanson, Ronald S. Caldwell
Volume III:	Donald F. Harker, Jr., Thomas C. Barr, Jr.
Volume IV:	Donald F. Harker, Jr., Dr. Perry B. Wigley
Volume V:	Donald F. Harker, Jr., Sara L. Sanders
Volume VI:	Donald F. Harker, Jr., Loy R. Phillippe, Richard R. Hanson, Ronald S. Caldwell

1.0. INTRODUCTION

In accordance with the National Environmental Policy Act (NEPA; 42 USC 4321 et seq.), the United States Environmental Protection Agency (USEPA) is required to conduct an environmental review prior to the issuance of New Source National Pollutant Discharge Elimination System (NPDES) permits for coal mining activities in the Eastern Kentucky Coal Field. For coal mining activities, "New Source" refers to all such operations which began construction after 17 September 1977. On that date draft standards of performance for New Sources were published to control the discharge of pollutants from coal mining activities. Simultaneously, environmental reviews of all New Source NPDES permit applications became mandatory for USEPA.

The Eastern Kentucky Coal Field Areawide Environmental Impact Assessment (EIA) was initiated to develop an effective NEPA compliance strategy. The purpose of developing a NEPA compliance strategy is to streamline USEPA's permit review process while still fulfilling the legislative requirements of the Clean Water Act (CWA; 33 USC 1251 et seq.) and NEPA. The need to streamline the permit review process arises from the projected influx of New Source coal mining permit applications during the next twenty years. If, as expected, future market conditions warrant increased coal production, USEPA Region IV will be faced with the responsibility of processing perhaps as many as 350 permit applications per year from the Eastern Kentucky Coal Field. However, the financial and human resources necessary to support this responsibility using existing procedures are not currently available and do not appear likely to be forthcoming. Consequently, the selected NEPA compliance strategy must simultaneously meet USEPA's environmental review responsibilities while also streamlining the review process in order to minimize time-consuming delays and the commitment of USEPA resources.

In order to achieve these objectives, a process was designed to develop alternative NEPA compliance strategies. This process has included the following elements:

- Description of the environmental resources of the Eastern Kentucky Coal Field in order to identify those resources which are sensitive to coal mining activity;

- Description and analysis of the existing and anticipated regulatory framework in eastern Kentucky regarding coal mining activities in order to determine the regulatory constraints with which a NEPA compliance strategy must comply;

- Identification of those resources sensitive to coal mining which are not protected by the existing regulatory framework in whole or in part;

- Discussion of generalized NEPA compliance strategies which defined the conceptual basis for individual, subareawide, and areawide strategies;

- Identification and analysis of the various options which could be incorporated into NEPA compliance strategies including resource threshold criteria and standard mitigating measures in the form of permit conditions for identified sensitive resource;

- Development of alternative NEPA compliance strategies which evaluated the options available at each stage as well as the temporal effects in order to define the feasible alternatives for individual, subareawide, areawide, and combined strategies; and

- Detailed description of those feasible strategies which were evaluated in regard to level of environmental benefit, USEPA resource requirements, costs to the applicant, time frame, and duplication of effort.

The information presented in this Areawide EIA is supported and supplemented by a Technical Reference Document and environmental baseline data illustrated in a Resource Atlas which consists of quadrangle basemaps with overlays that display various environmental resources. The Technical Reference Document and Resource Atlas are available for inspection at the Lands Unsuitable for Mining Program Office, Kentucky Department for Natural Resources and Environmental Protection, Frankfort, Kentucky, and at USEPA Region IV in Atlanta, Georgia. The Resource Atlas is also available for inspection at the Office of Surface Mining in Knoxville, Tennessee.

The chapters that follow provide a description of mining activities, the existing condition of the environment, the impacts of mining activities on the environment, and the measures that can be applied to mitigate the environmental impacts of mining activities in the Eastern Kentucky Coal Field. Also described are the State and Federal regulations that govern mining activities, the alternative NEPA compliance strategies considered by USEPA, and the consequences of implementing the proposed compliance strategy in terms of the level of environmental protection and the cost and time requirements for application preparation and the environmental review of the application.

2.0 MINING ACTIVITY

2.1 HISTORICAL SUMMARY

The mining of coal in eastern Kentucky commenced during the late 1700's. The first known commercial mine opened during 1790 near Beattyville in Lee County. Until the mid 1860's when rail transportation was introduced, production remained relatively constant. Except during a few periods, the production of coal has increased steadily since the 1860's.

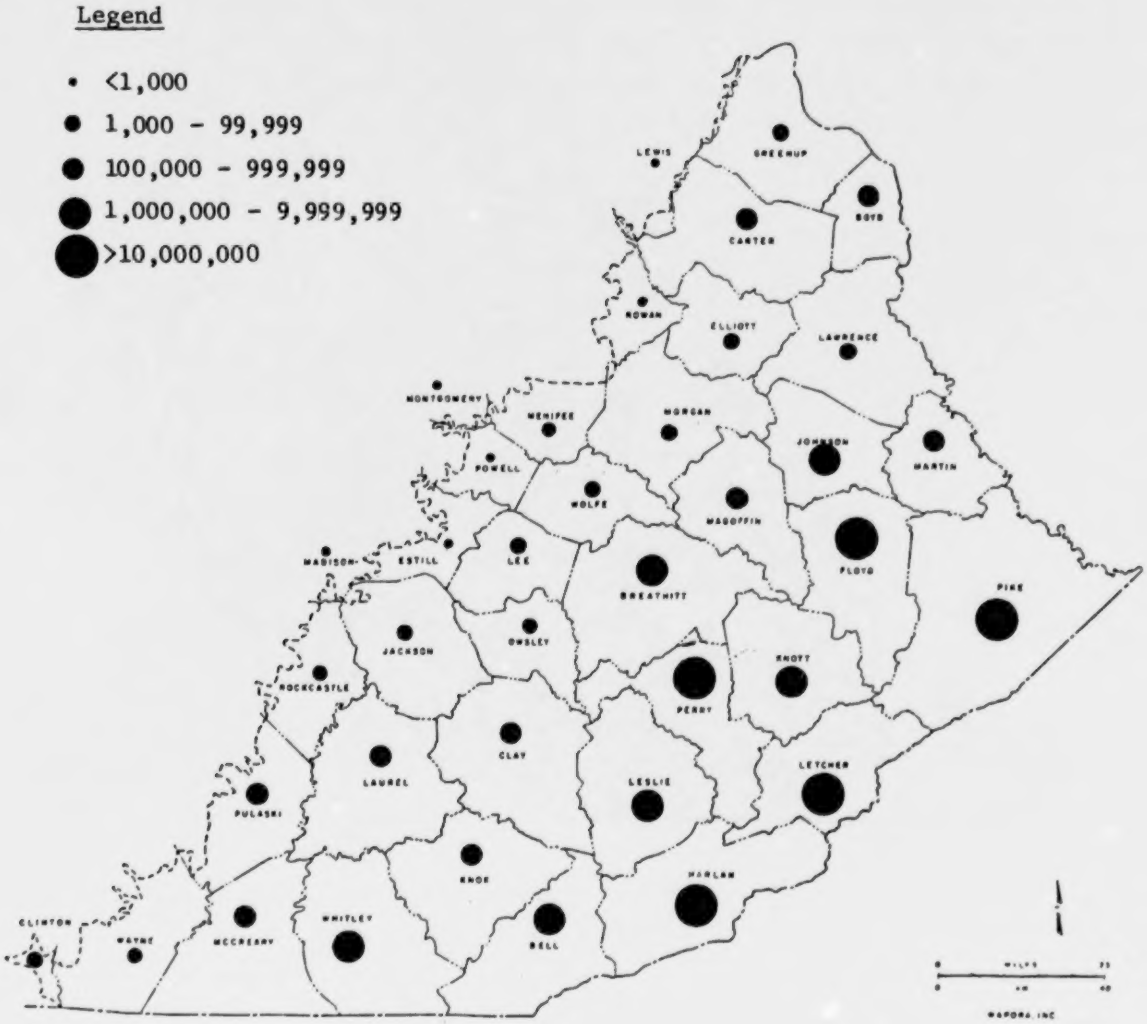
Estimated coal production between 1790 and the early 1900's was not differentiated by mining method. These estimates presumably represent production from underground mines as the first surface mine was reported to commence production in 1928. Production from surface mines rose rapidly in the mid 1960's to levels that began to exceed production from underground workings in the mid 1970's.

However, by 1980 underground mining had again taken the lead in eastern Kentucky coal production. As the demand for lower sulfur coal increased and as surface mining regulations became more economically burdensome, the total amount of coal produced from surface mining decreased 9% from 54 million short tons in 1978 to 49 million short tons in 1980 (KDMM 1980; Table 2.1-1). Meanwhile, the coal production from underground mining increased from 27 million short tons in 1978 to over 59 million short tons in 1980, an increase of 120%.

Overall, the coal mining industry in eastern Kentucky has grown, increasing from 81 million short tons in 1978 to over 108 million short tons in 1980. By 1980 more than 41,000 people were reported working on 2,134 eastern Kentucky coal mines. While the percentage of coal produced from surface mining fell to 45% of the total, the actual number of surface mines (1,169) was greater than that of underground mines (965) for 1980. Figure 2.1-1 depicts the distribution of coal production among the counties in eastern Kentucky while Figure 2.1-2 portrays the dispersion of surface mines among the counties.

Table 2.1-1. Tonnages produced from eastern Kentucky coal mines in short tons, 1978 and 1980 (KDMM 1980).

COUNTY	SURFACE MINING			UNDERGROUND MINING		
	1978	1980	% Change	1978	1980	% Change
Bath	-	-	-	-	-	-
Bell	3,707,771	4,377,927	+18	1,872,818	2,276,458	+22
Boyd	646,640	366,929	-48	-	-	-
Breathitt	5,861,838	7,244,083	+24	165,087	66,874	-59
Carter	470,774	357,465	-24	-	-	-
Clay	964,807	1,787,540	+85	935,181	714,404	-24
Clinton	9,244	-	n/a	-	-	-
Elliott	920,026	716,946	-22	-	-	-
Estill	-	400	n/a	-	-	-
Floyd	2,810,112	1,212,050	-57	2,953,713	4,401,361	+49
Greenup	422,315	62,637	-85	-	-	-
Harlan	1,275,621	579,026	-55	7,846,130	11,680,421	+49
Jackson	195,000	129,500	-34	30,000	-	n/a
Johnson	1,955,042	861,345	-56	254,265	398,762	+57
Knott	2,548,260	2,622,633	+3	3,039,094	3,323,977	+9
Knox	1,441,872	1,527,777	+6	183,520	377,824	+106
Laurel	1,332,245	1,433,193	+8	23,234	281,687	+1100
Lawrence	1,333,706	837,405	-37	-	-	-
Lee	293,400	52,550	-82	9,652	-	n/a
Leslie	2,400,492	2,418,754	+1	2,695,540	1,939,157	-28
Letcher	1,324,914	1,752,418	+32	3,467,734	3,286,858	-5
Lewis	-	-	-	-	-	-
Madison	-	-	-	-	-	-
Magoffin	2,353,284	2,717,428	+15	244,892	401,832	+64
Martin	6,126,461	8,294,846	+35	3,145,877	4,937,838	+57
McCreary	750,808	213,039	-71	53,113	520,668	+881
Menifee	32,250	-	n/a	-	-	-
Montgomery	-	-	-	-	-	-
Morgan	2,063,609	469,229	-77	-	2,662	n/a
Owsley	1,197,954	268,371	-78	-	-	-
Perry	5,139,754	3,995,595	-22	-	2,494,959	n/a
Pike	3,140,139	2,913,347	-7	-	22,306,014	n/a
Powell	-	-	-	-	-	-
Pulaski	388,167	381,941	-2	-	4,226	n/a
Rockcastle	99,005	201,157	+103	15,319	-	n/a
Rowan	-	-	-	-	-	-
Wayne	274,808	-	n/a	8,000	-	n/a
Whitley	2,151,451	1,348,496	-37	112,691	187,448	+66
Wolfe	437,154	75,381	-83	-	-	-
TOTAL	54,068,926	49,189,411	-9	27,055,860	59,603,430	+120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PIKE
JACKSON
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KNOTT
ROCKCASTLE
PERRY
CLAY
LAUREL
LESLIE
LETCHER
PULASKI
KNOX
HARLAN
CLINTON
WAYNE
MCCREARY
WHITLEY
BELL
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Figure 2.1-1. Accumulated coal production (tons) for 1980 by county in the Eastern Kentucky Coal Field.

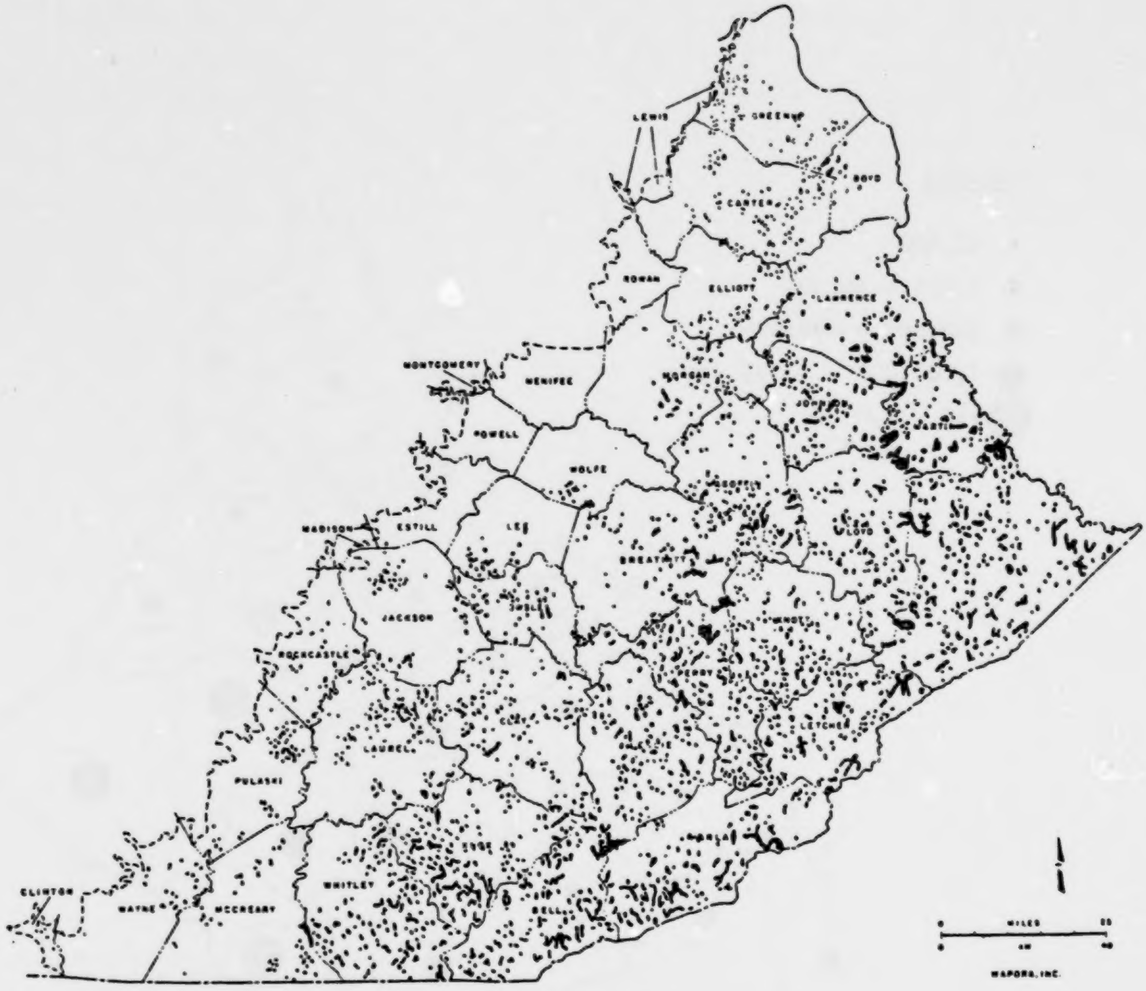
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Figure 2.1-2. Surface mines of the Eastern Kentucky Coal Field based on mapping from 1978 aerial photographs by the USEPA Environmental Photographic Interpretation Center.

Most of the coal that is produced in Kentucky from underground mines requires some form of cleaning for the removal of ash-forming materials. Coal preparation plants are found predominantly in the southeastern half of the Coal Field (Figure 2.1-3).

2.2 CURRENT MINING

2.2.1 Surface Mining

Surface coal mining in eastern Kentucky is practiced where the ratio of overburden thickness to coal thickness does not exceed 30:1. Typically, minable coal seams are exposed along the flank of a mountain and are mined by contour surface mining methods. In contour stripping, an initial cut is made into the mountainside to the point at which the overburden to coal ratio limits the economic feasibility of further mining or where the authorized bench width is achieved. Subsequent cuts are then made into the mountain adjacent to the previous ones. Overburden stripped from an active cut is used to regrade the previous cut to the approximate original contour. This process continues around the mountainside, producing a long, sinuous line of reclaimed surface-mined land.

If the overburden is not excessively thick, another form of strip mining known as mountaintop removal can be practiced. In mountaintop removal the first cut is usually made parallel to the ridge. Overburden from the first cut is stored in a head-of-hollow fill and the coal is then removed. Subsequent cuts are made adjacent to the first, and the overburden is deposited in the previous cut to approximate the original topography. This process continues until the entire mountaintop has been removed. The result of mountaintop removal reclamation procedures can be a flat or gently rolling expanse which can have a higher land use potential than the original, steeper slopes.

The development of surface mines requires the creation of haul roads, one or more active pits, reclaimed areas, and surface water diversion, retention, and discharge structures. As surface mining continues,

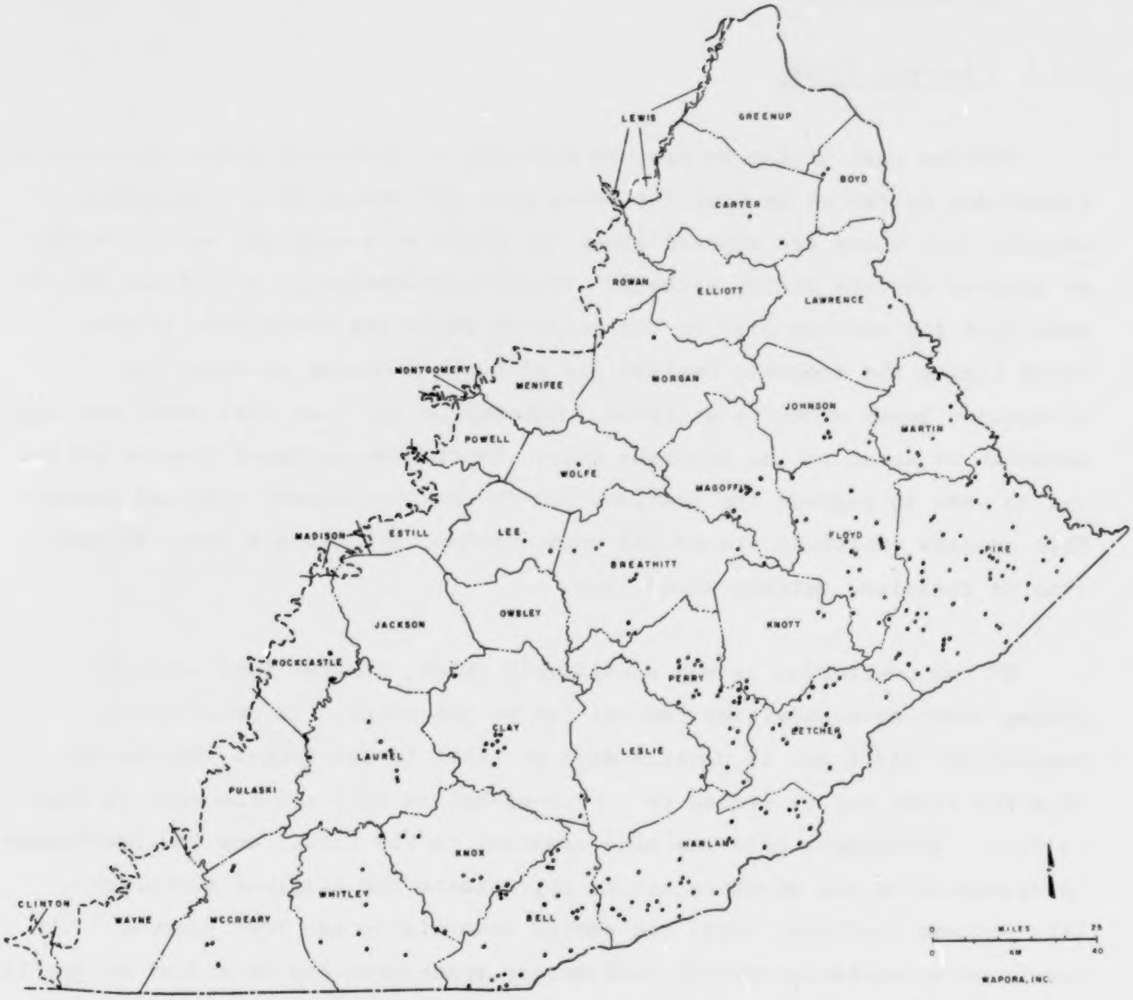
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Figure 2.1-3. Coal preparation facilities in the Eastern Kentucky Coal Field based on mapping from 1978 aerial photographs by the USEPA Environmental Photographic Interpretation Center.

additional sections of each permit area are disturbed while previously mined areas are reclaimed.

2.2.2 Underground Mining

Underground coal mining has been practiced in eastern Kentucky for nearly 200 years. The earliest mines were cut directly into coal seams exposed along the hillsides of major waterways. The modern underground coal mine bears faint resemblance to the mine of days past. A modern underground mine may be reached through shaft, drift, or slope entryways. Shafts and slope entryways are driven through overburden to reach the coal seam where it is not exposed at an outcrop. The choice of vertical shaft versus slope entryway usually depends on the proposed size of the entryway and the proposed haulage system as well as the ventilation system and other service considerations. A drift entryway is driven into a coal seam from its outcrop.

Coal can be extracted using two basic layouts. Many mines in eastern Kentucky use a combination of both of the following:

- Room and pillar - Entryways are driven through the seam to the area to be mined. Crosscuts for ventilation are driven perpendicular to the entryways. The typical passageway is 15 feet wide. Coal is cut from panels at the ends of passageways, leaving pillars of uncut coal to support the roof. The pillars may be extracted prior to abandoning the passageways.

- Longwall and shortwall - Entries and crosscuts are developed as in room and pillar mining. Long panels of coal are left unexcavated, providing working faces for coal cutting machinery. Coal is planed or shaved from the panels and loaded out by conveyor belts that run parallel to the panels. The roof in the immediate vicinity of a working panel is supported by large jacks or props. As mining proceeds into the panel, the roof supports advance toward the retreating panel. The roof over the mined area behind the supports collapses.

The direction in which a mine is developed with respect to the dip of a coal seam has a direct bearing on the production and movement of acid drainage during and after active mining operations. In mines developed in a coal seam that rises from the horizontal as it is entered (an up-dip mine), water drains freely in response to gravity without the need for pumping. This free-flowing water is difficult or impossible to stop following mining, and as a source of contamination may require perpetual treatment. If sulfur-containing pyritic materials are present and are exposed to air and then dissolved by water flowing through the mine, acid mine drainage may result. It generally is not feasible to flood up-dip mines in order to prevent the formation of acid mine drainage.

Down-dip mines and mines developed with shafts or sloped entryways typically must have nuisance water removed by pumps during operations. After the deepest sections of the seam are mined, they then can be allowed to flood with natural drainage. The mine pool elevation generally is controlled during operation of the mine and is allowed to stabilize with the local hydrogeologic regime after the mine is abandoned. Such flooding can successfully isolate the acid-producing materials in the mine from air, thereby preventing the formation of acid mine drainge. Should uncontrolled fluctuation of the mine pool occur, acid drainage could result and contaminate aquifers and/or surface water bodies.

2.2.3 Coal Preparation

Most of the coal which is produced from underground mines requires some form of cleaning and grading before its sale. Unprocessed coal is termed run-of-mine coal. Surface-mined coal is generally less contaminated with ash-forming materials than underground-mined coal which typically contains roof rock and underclay that must be removed to enhance the marketability of the coal. Run-of-mine coal is generally moved from the mines to the preparation plant by truck.

The coal and refuse are dewatered after processing and shipped to market or spoil disposal areas as appropriate. From the preparation plant, the processed coal may be shipped by rail, barge, or truck. The facilities required to process coal therefore include transportation facilities for run-of-mine coal and cleaned coal, a receiving area, a crusher, the processing plant itself, administrative and repair buildings, a product storage area, and spoil banks.

Most coal preparation plants are relatively small physically, requiring minimal acreage for facilities exclusive of the spoil sites. The spoil sites may require substantially more area than the plant itself, especially after long operation. Current Federal Surface Mining Control and Reclamation Act (SMCRA; PL 95-87, 30 USC 1201 et seq.) regulations require that spoil piles be constructed outside floodplains and in accordance with proper engineering practice. Toxic materials must be isolated to prevent the long-term formation of a contaminated discharge.

2.3 FUTURE MINING

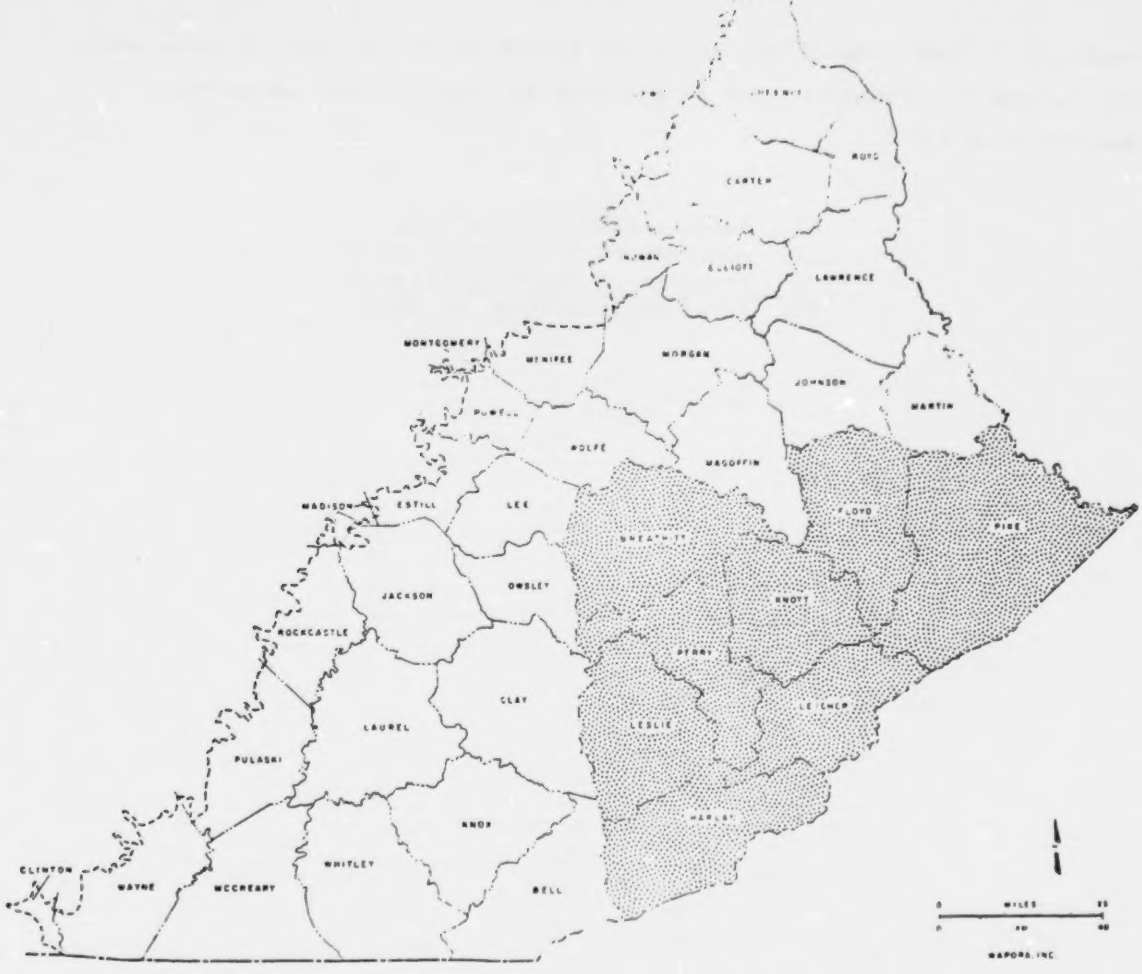
Coal supply models developed for the purpose of projecting future mining activity require a number of approximations, any one of which may adversely affect the reliability of the projection. Some of the assumptions that are least reliable involve projections of foreign coal demand, substitution of petroleum based fuels, a lack of major breakthroughs in energy technology (nuclear, solar, or hydropower), little substitution of western coal for Appalachian coal, and real increases in the price paid for coal. For the purposes of this projection, which is based upon the National Coal Model of the US Department of Energy (USDOE 1978), steadily increasing demand for Appalachian (Kentucky) coal and a real price increase to an average of at least $35 per ton by 1985 (1975 dollars) was assumed. Also assumed was approximately constant production on a county-by-county basis from 1985 through 2000.

Based on the projected future demand for low sulfur coal, underground mining probably will increase significantly during the early 21st century. Counties with large reserves of high quality coal could expect a considerable increase in mining activity at that time. Eight counties in eastern Kentucky have reserves of high quality coal in excess of 400 million tons. Production projections through 1985 indicate that reserve depletion in these counties will be relatively insignificant. Therefore, a considerable increase in mining activity is projected for Floyd, Harlan, Knott, Leslie, Letcher, Breathitt, Perry and Pike Counties through the year 2000 (Figure 2.3-1).

The projections indicate that the number of NPDES permit actions required by USEPA should be approximately constant through the year 2000. During 1980, as the most recent base year, the Kentucky Department of Natural Resources and Environmental Protection Bureau of Surface Mining (KDNREP-BSM) processed 657 New and Amendment Surface Mine Permits and 437 New and Amendment Underground Mine Permits in the Eastern Kentucky Coal Field. In addition, KDNREP BSM processed and issued permits for 79 new coal preparation plants in the entire State during 1980. A separate permit is issued for each mining application filed. These figures reflect several factors which may or may not influence the number of future permit applications including:

- Coal preparation plants were subject to KDNREP BSM review for the first time in 1980, resulting in a large first year influx of applications.
- Applications submitted under the presumably less stringent Interim SMCRA Program were accepted by KDNREP BSM only through 1 December 1980. Consequently, many operators may have submitted applications for areas which they expect to mine during the next five years in order to avoid the more stringent Permanent Program regulations.

USEPA has used a different approach in the issuance of NPDES permits for mining operations. The NPDES application includes information describing the projected five year mining plan for the operation. With this information and data on the location of point source discharges, Region IV consolidates NPDES applications and issues an "area" NPDES permit sufficient for five years. Any additional mining facilities initiated during the five year period within such an area is covered under this area permit. This approach reduces the number of NPDES permits issued by USEPA significantly in comparison to KDNREP-BSM mining permits. During 1980, 250 NPDES permits were issued by USEPA for the entire state of Kentucky. While annual permit application figures could be as high as 500 per year due to increased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BELL
MILES
WAPORA, INC.

Figure 2.3-1. Counties in eastern Kentucky with projected significant increases in coal mining activity through the year 2000.

emphasis on coal production, an annual figure of 350 is used in this study. The categorical breakdown for this estimated annual number of permit applications is:

180	Surface Mine Applications
120	Underground Mine Applications
50	Preparation Plant Applications
350	Total Applications Per Year.

3.0 ENVIRONMENTAL RESOURCES OF THE EASTERN KENTUCKY COAL FIELD

This chapter presents a brief summary of the principal natural resources existing in the Eastern Kentucky Coal Field. The existing conditions of the climate, earth, water, biological, land, human, cultural, air, and noise environment are described in this chapter. For additional details concerning these resource categories, the interested reader is referred to the Technical Reference Document prepared in conjunction with this Environmental Impact Assessment which covers the following subject areas:

Current Mining Activity
Future Mining Activity
Surface Water Resources
Groundwater Resources
Topography
Soils
Geology
Air Quality and Meteorology
Biological Resources
Land Resources
Human Resources
Cultural and Recreational Resources
Geoenvironmental Resources
Acoustic Environment

In addition, a Resource Atlas consisting of resource overlays for the USGS 7.5-minute quadrangle maps of the Eastern Kentucky Coal Field has been prepared. The resource overlays cover the following subject areas:

Mining Operations
Land Use
Cultural Resources
Water Resources and Natural Features
Additional Features
Interpreted Critical Areas
Unstable Slopes and Prime Agricultural Lands

The Technical Reference Document and one copy of the Resource Atlas are available for inspection at USEPA Region IV in Atlanta, Georgia. Additional copies of the Atlas are available at the Lands Unsuitable for Mining Program

Office, Kentucky Department for Natural Resources and Environmental Protection, Frankfort, Kentucky.

3.1 CLIMATE

The climate of eastern Kentucky is influenced strongly by the diverse topography of the Commonwealth. Westerly winds bring a succession of low-pressure storm systems to the Eastern Kentucky Coal Field. These low-pressure systems include winds that circulate counter-clockwise, as is the case with all storm systems in the northern hemisphere. Storms that approach the Coal Field from the west, therefore, are accompanied by southwest winds that contain warm, moist air from the southern states and the Gulf of Mexico. The low-pressure systems periodically are displaced by high-pressure systems including winds that circulate in a clockwise direction. High-pressure systems, therefore, bring cool, dry air from the northwest (Karan and Mather 1977).

The frequently alternating passage of low- and high-pressure systems results in changeable weather conditions during each season. Weaker storms that originate in the east generally are blocked by Pine Mountain and the Cumberland Mountains along the eastern boundary of Kentucky. Hurricanes in the Gulf of Mexico generally produce rainstorms in Kentucky.

3.1.1 Precipitation

In eastern Kentucky, the greatest amount of precipitation occurs during spring; the least amount occurs during autumn (NOAA 1977). Precipitation patterns throughout the Coal Field generally are uniform. Annual rainfall in eastern Kentucky varies by less than 10 inches (Karan and Mather 1977). The highest and lowest average annual rainfall recorded in the Coal Field from 1951 through 1974 differed by only 13 inches. The lowest average annual rainfall (40.77 inches) was recorded at Ashland in the northern part of the Coal Field. The highest annual average rainfall (53.07 inches) was reported at Cumberland in the southern, mountainous part of the Coal Field.

Thunderstorms with heavy rainfalls frequently occur during the spring and summer. Total rainfall during a thunderstorm often exceeds 2 or 3 inches. Precipitation may exceed 5 or 6 inches during a 24-hour period. Flash floods frequently result from these intense storms. Warm, moist tropical air predominates during the summer when the relative humidity is consistently high (NOAA 1977).

On average, the Coal Field generally experiences precipitation as rain, sleet, or snow for a minimum of 110 days of the year. The maximum number of days with precipitation may exceed 150 annually on the southeastern fringe of the Coal Field (Karan and Mather 1977). Snow and sleet may occur at certain reporting stations during 6 to 8 months of the year. From 1951 through 1974, the average annual accumulation of snow and sleet in the Coal Field was approximately 15 inches.

3.1.2 Temperature

The prevailing climate of Kentucky is continental, leading to wide extremes of temperature within the Eastern Kentucky Coal Field. The mean annual temperature ranges from 54.8°F at Ashland in the northern part of the Coal Field to 55.2°F at Cumberland in the southern part. Temperatures during June, July, and August may exceed 100°F. The average temperature during summer generally is about 75°F while minimum temperatures of 0°F or lower may occur in the Coal Field during December, January, and February. Average temperatures during these three winter months generally range from 30° to 40°. The last spring freeze in the Coal Field generally occurs during April while the first autumn freeze usually occurs during October (NOAA 1977). The average duration of freeze-free conditions in the Coal Field is 166 days.

3.1.3 Wind

The average wind velocity in Kentucky is 7 to 12 miles per hour (mph) from the south and southwest. In some parts of eastern Kentucky, the prevailing winds during autumn are from the north. The highest wind speeds usually are 50 to 70 mph, but during some storms (generally squalls associated with thunderstorms) gusts of wind may exceed these speeds. One tornado per year usually is reported in Kentucky. Actual frequencies of tornado occurrence range from none for several years to several during one year (NOAA 1977).

3.1.4 Mixing Heights

Mixing layer height is defined as the height above the ground through which relatively vigorous mixing occurs. Atmospheric pollutants are relatively concentrated below the mixing layer. The mean annual morning mixing height in the Coal Field is approximately 1,700 feet. The mean afternoon mixing heights range from approximately 2,300 to 5,900 feet during spring and 1,300 to 4,600 feet during autumn. Mixing heights in eastern Kentucky are generally high relative to those of other areas in the continental US. The high mixing heights are due in part to the rugged topography which varies from the highly dissected Cumberland Plateau in the western part of the Coal Field to the parallel alternating ridges and valleys of the east. This topography promotes the formation of vertical air currents that enhance the mixing of ambient air. Long-lasting, low-level inversions and extreme air pollution episodes, therefore, are infrequent in the Coal Field although some air quality problems may occur.

3.1.5 Micrometeorological Conditions

The rugged topography of eastern Kentucky is a contributing factor to local variations in climate and air quality. Wind direction, wind speed, temperature, precipitation, and mixing heights can be influenced locally by the complex terrain. Meteorological conditions also are influenced by the length, depth, and breadth of valleys and the steepness and orientation of slopes. The numerous, narrow valleys in eastern Kentucky are susceptible to localized inversions and air quality problems.

3.2 EARTH RESOURCES

3.2.1 Physiography

The eastern one-third of Kentucky (including the entire Eastern Kentucky Coal Field) is in the Appalachian Highlands physiographic division. The Appalachian Highlands is the mountainous region of the eastern United States. The central part of the Highlands includes four divisions that can be distinguished by their structural geologic origins. These include the Piedmont Province, the Blue Ridge Province, the Valley and Ridge Province, and the Appalachian Plateau Province.

All of the Eastern Kentucky Coal Field is included within two of these provinces. The Valley and Ridge Province is represented by the Cumberland mountain section (Figure 3.2-1). The Appalachian Plateau Province includes the Kanawha section and the Cumberland Plateau section (Killburn et al. 1962; Price et al. 1962). The Cumberland Plateau section has characteristically lower relief than the Kanawha section. The latter is more strongly dissected by surface drainage ways.

The greatest topographic relief found in the Eastern Kentucky Coal Field as well as the highest elevation in the State (4,139 feet) is found on Black Mountain between Pine Mountain and Cumberland Mountain. The lowest point in the Coal Field is 485 feet, the normal pool elevation of the Ohio River as it leaves Greenup County.

3.2.2 Regional and Economic Geology

The coal-bearing rocks of the Eastern Kentucky Coal Field were formed from sediments which accumulated in the coastal environment of a shallow inland sea which existed during the Pennsylvanian Period. This coastal environment included a complex deltaic system comprised of rivers, swamps, estuaries, barrier islands, and back-barrier lagoons. Migration of this ancient coastline and delta complex followed a northwesterly trend producing a thick clastic wedge of coal-bearing strata. The erosion of crystalline rocks in the Piedmont provided a sediment source for the deltas. Deposited rocks were later folded and faulted by tectonic deformational stresses.

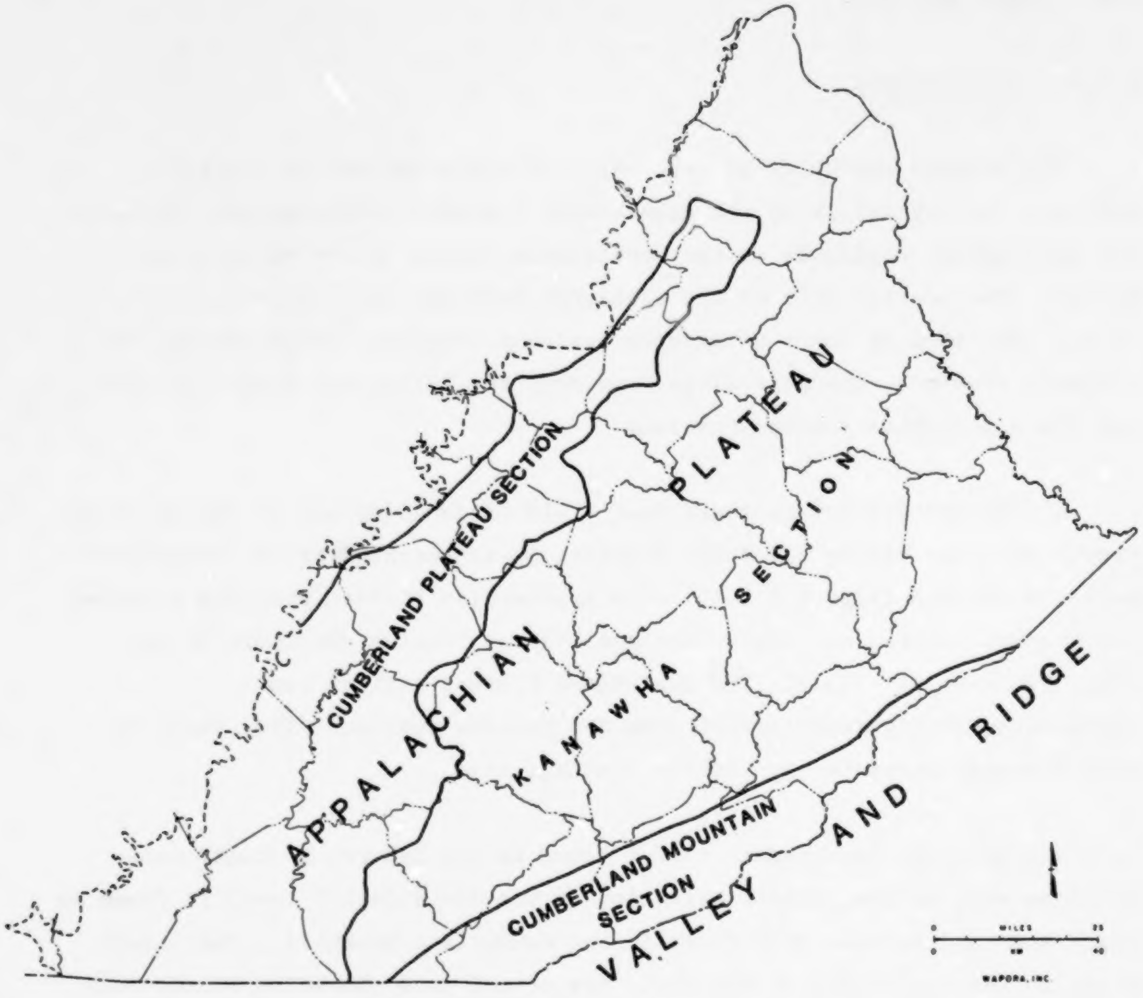

CUMBERLAND PLATEAU SECTION
APPALACHIAN PLATEAU
KANAWHA SECTION
CUMBERLAND MOUNTAIN SECTION
VALLEY AND RIDGE
0 MILES 25
0 KM 40
WAPORA, INC.

Figure 3.2-1. Physiographic sections in the Eastern Kentucky Coal Field (Kilburn et al. 1962; Palmquist and Hall 1960; Price et al. 1962).

Surface rocks in the Eastern Kentucky Coal Field range in age from Devonian through Pennsylvanian. The Devonian and Mississippian rocks are primarily exposed along the western border of the Coal Field. The coal-bearing Pennsylvanian strata underlie most of eastern Kentucky (Figure 3.2-2).

The coal reserves of the Eastern Kentucky Coal Field are quite extensive. As indicated in Figure 3.2-3 the counties with the larger reserves are located in the eastern part of the Coal Field. Eight counties have reserves of high quality coal in excess of 400,000,000 tons. These counties include Breathitt, Floyd, Harlan, Knott, Leslie, Letcher, Perry, and Pike Counties. Pike County has the largest coal reserves with over 2 billion tons. Eight counties have reserves of from 90 to 400 million tons, and the remaining counties have less than 90,000,000 tons.

3.2.3 Toxic Material

Toxic overburden includes earth materials which contain significant amounts of sulfur-bearing minerals with acid-forming potentials that exceed the neutralization capacity of associated strata. The extent to which an overburden is toxic is a function of its chemical and physical characteristics. The distribution of toxic overburden in eastern Kentucky is a function of the depositional environments in which the coal-bearing strata were formed. Coal seams associated with toxic overburden in eastern Kentucky are listed in Table 3.2-1.

3.3 WATER RESOURCES

3.3.1 Surface Water Resources

The surface water resources of the Eastern Kentucky Coal Field are comprised of five principal watersheds: (1) the Little Sandy-Ohio-Tygarts Creek Basin; (2) the Licking River Basin; (3) the Big Sandy River Basin; (4) the Kentucky River Basin; and (5) the Upper Cumberland River Basin (Figure 3.3-1). Each of these river systems eventually flows to the Ohio River. Surface mining activities affect these surface water resources by causing

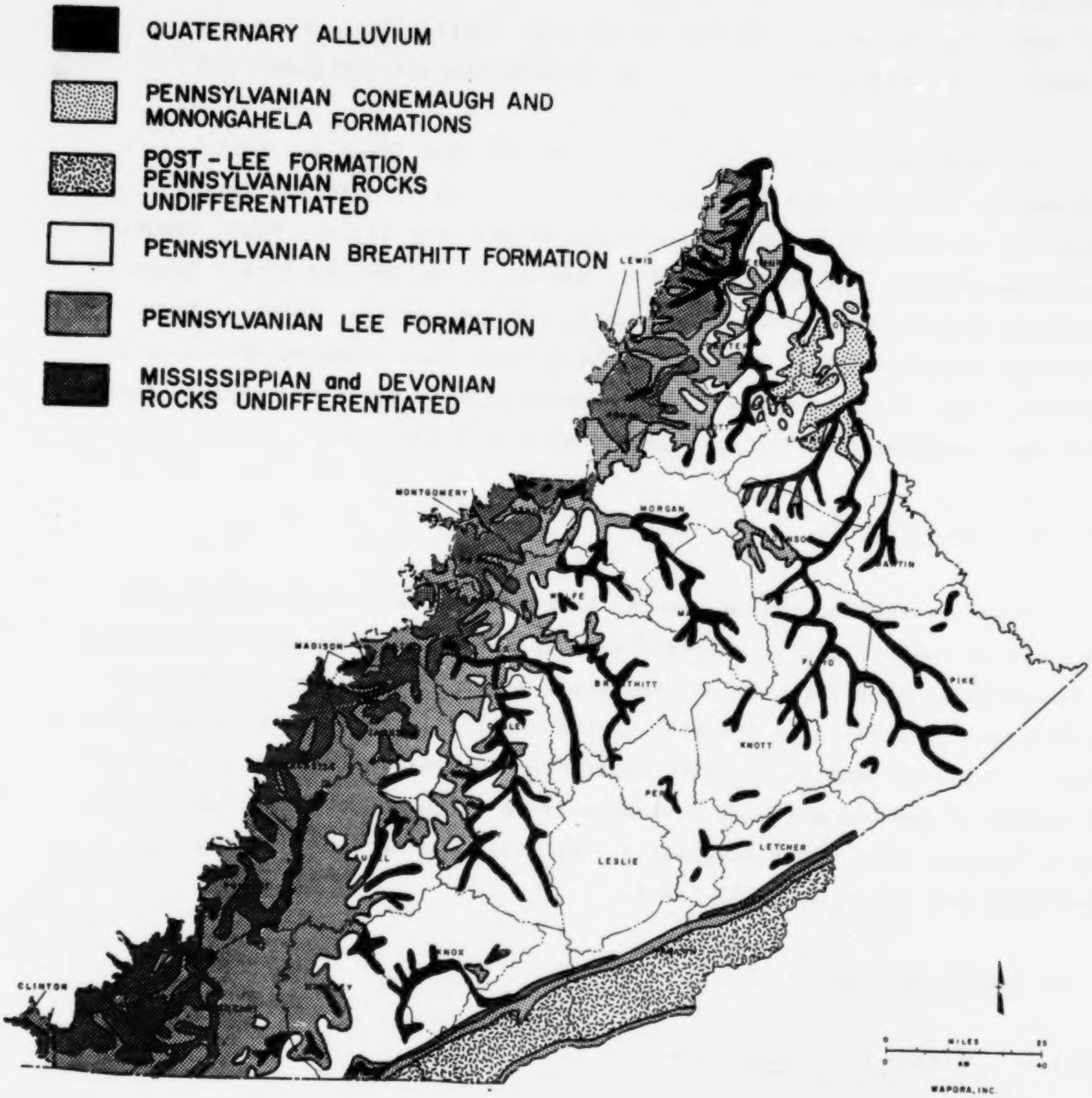
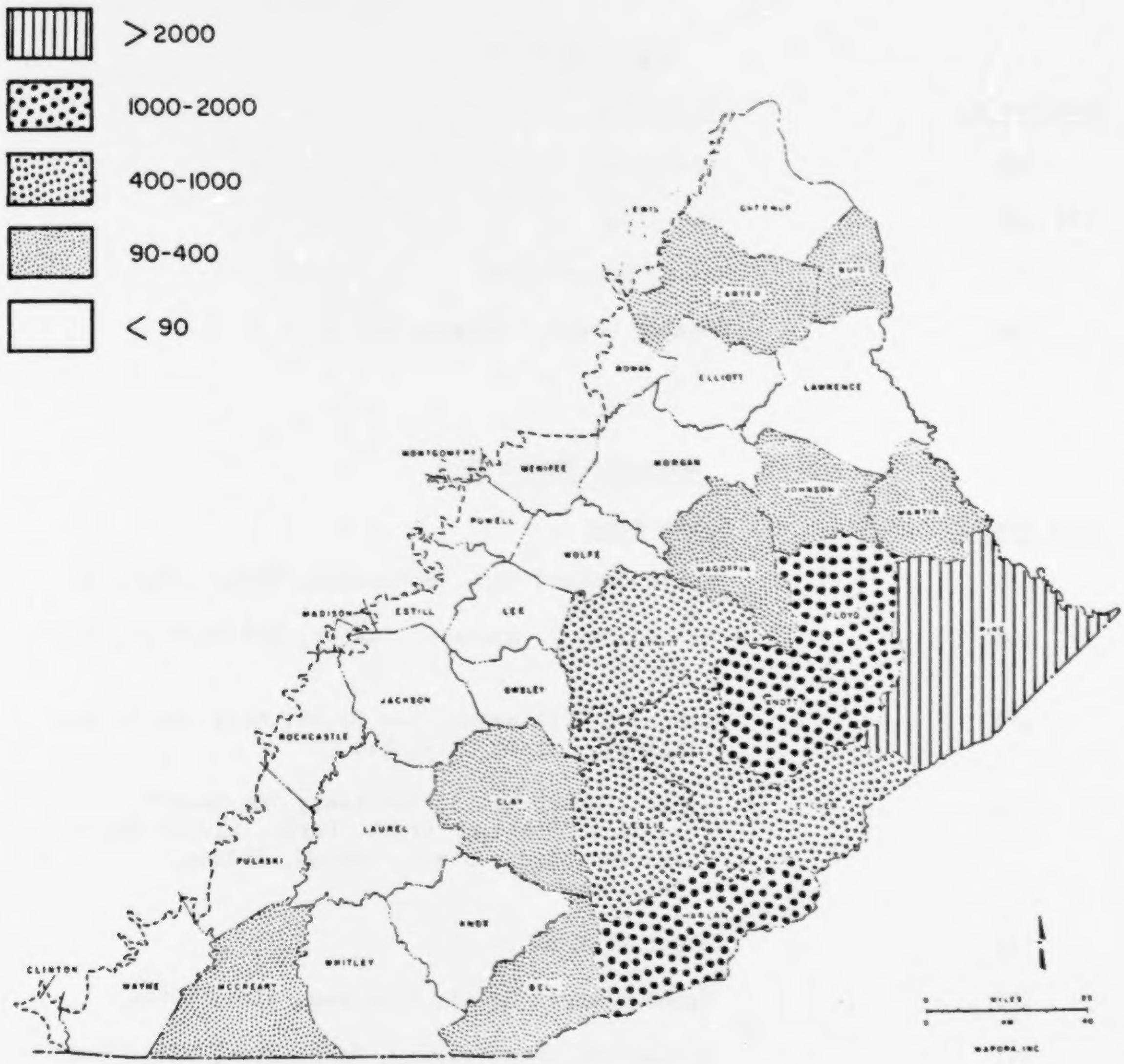

QUATERNARY ALLUVIUM
PENNSYLVANIAN CONEMAUGH AND MONONGAHELA FORMATIONS
POST-LEE FORMATION PENNSYLVANIAN ROCKS UNDIFFERENTIATED
PENNSYLVANIAN BREATHITT FORMATION
PENNSYLVANIAN LEE FORMATION
MISSISSIPPIAN and DEVONIAN ROCKS UNDIFFERENTIATED
LEWIS
MONTGOMERY
MORGAN
MADISON
BREATHITT
PIKE
KNOTT
LETCHER
LESLIE
KNOX
CLINTON
0
MILES
25
0
KM
40
WAPORA, INC.

Figure 3.2-2. Geology of the Eastern Kentucky Coal Field, based on data from the USGS 7.5 series of geological quadrangle maps.



▥ >2000
⠿ 1000-2000
⠿ 400-1000
▒ 90-400
☐ < 90
LEWIS
GREENUP
BOYD
CARTER
ROWAN
ELLIOTT
LAWRENCE
MONTGOMERY
MENIFEE
MORGAN
JOHNSON
MARTIN
POWELL
WOLFE
MAGOFFIN
FLOYD
PIKE
MADISON
ESTILL
LEE
BREATHITT
KNOTT
OWSLEY
JACKSON
ROCKCASTLE
CLAY
LAUREL
PULASKI
KNOX
CLINTON
WAYNE
MCCREARY
WHITLEY
BELL
MILES
WAPORA, INC

Figure 3.2-3. Projected coal reserves (millions of tons) in eastern Kentucky for 1 January 1985.

Table 3.2-1. Coal seams associated with toxic overburden in eastern Kentucky (USFS n.d.; Kimball n.d.).

HIGH POTENTIAL

Seam Number	Seam Name
100	Hazard No. 8, Francis
134,135	Sterling
212	Lily, Horse Creek
294	Beaver Creek, Stearns No. 2

MODERATE POTENTIAL

Seam Number	Seam Name
100	Peach Orchard Zone, Sebastian, Fugate, Mudseam
104	Hazard No. 7, Nickell, Oakley, Red Springs, High Splint
142	Amburgy, Williamson, Gun Creek, Moss Creek, Low Splint, Cannel City, Rim
151	Upper Elkhorn No. 3, Van Lear, Tom Cooper, Jellico, Straight Creek, Darby, Little Caney, Thacker, Cedar Grove, Nosben, Sidney, Kellioka
154	Upper Elkhorn No. 2
157	Upper Elkhorn No. 1, Blue Gem, Alma, Hance
212	Sachariah, Wheelersburg, Manchester, River Gem, Swamp Angel, Vanclerie
233	Clear Fork, Naese

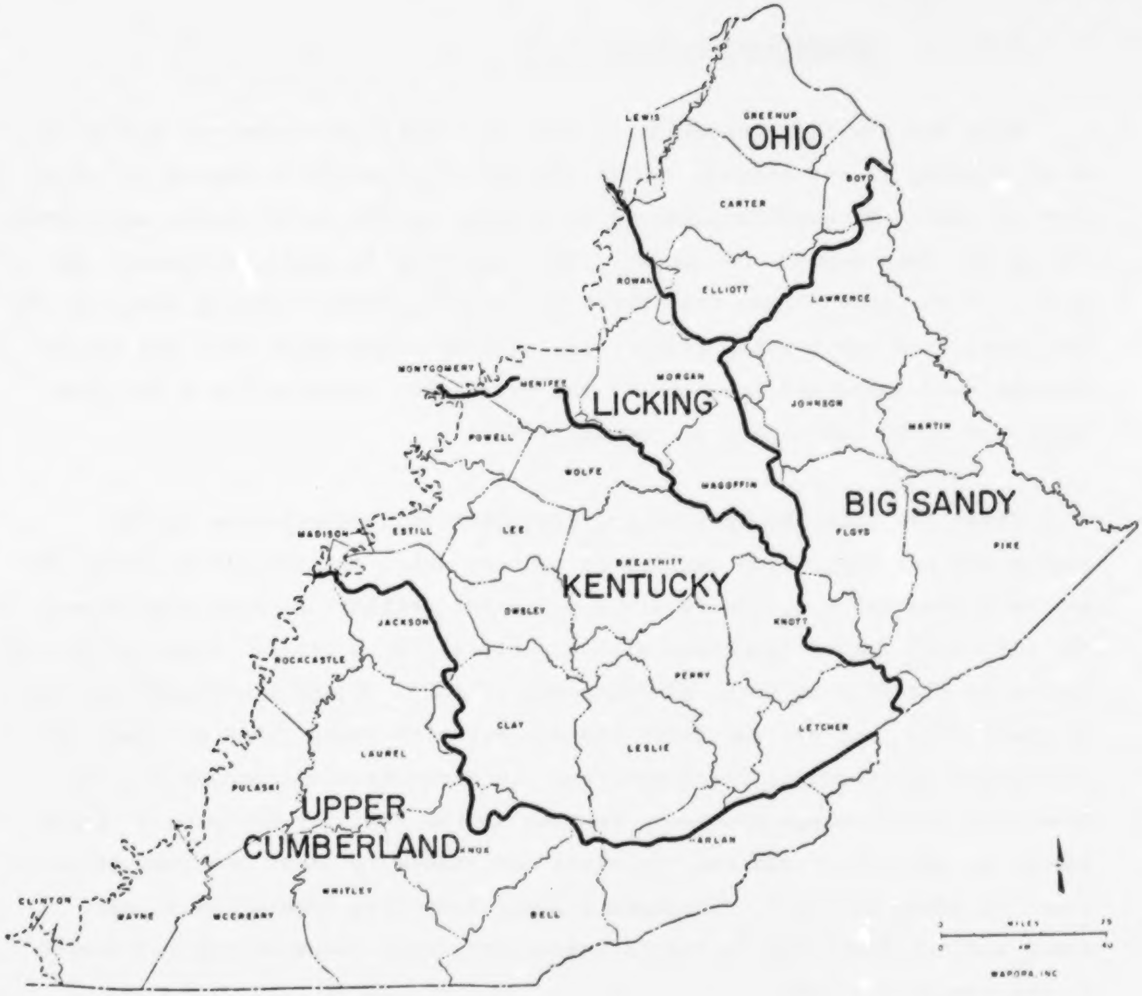

LEWIS
GREENUP
OHIO
BOYD
CARTER
ROWAN
ELLIOTT
LAWRENCE
MONTGOMERY
MENIFEE
MORGAN
LICKING
JOHNSON
MARTIN
POWELL
WOLFE
MAGOFFIN
BIG SANDY
MADISON
ESTILL
LEE
BREATHITT
KENTUCKY
FLOYD
PIKE
JACKSON
OWSLEY
KNOTT
ROCKCASTLE
PERRY
CLAY
LETCHER
LAUREL
LESLIE
PULASKI
UPPER CUMBERLAND
KNOX
HARLAN
CLINTON
WAYNE
MCCREARY
WHITLEY
BELL
0 MILES 25
0 KM 40
WAPORA, INC

Figure 3.3-1. Major river basins in the Eastern Kentucky Coal Field.

ponding, by altering drainage divides, and by causing a reduction in the quality of these waters. The character of the surface water resources in the Eastern Kentucky Coal Field is affected by climatic conditions, streamflow characteristics, and water quality conditions in the five basins.

3.3.1.1 Streamflow Characteristics

Data for the five subbasins in the Coal Field show that the volume of water flowing in the streams varies greatly from season to season and from year to year. Streamflow tends to be highest in the early spring and lowest during the late summer and autumn. Thunderstorms in small watersheds can give rise to local floods from March through September. During times of the low flow, many small tributaries cease flowing altogether; only the larger streams have sustained low flows. The Ohio River mainstem has a low flow volume of 9,900 cubic feet per second (cfs).

Given the steep topography and frequency of thunderstorms in the region and the prevailing settlement pattern which intensively utilizes the narrow stream valleys, floods are a recurrent problem of major significance. The principal agency concerned with structural flood control measures in the region is the US Army Corps of Engineers (USACE). Control measures include 13 reservoirs that provide flood storage capacity among other purposes and 25 channel improvement, floodwall, and levee construction projects. The Community Flood Damage Abatement Program in the Kentucky Division of Water Resources provides funds and technical assistance to local governments to abate flooding problems. Floodprone areas have been identified in many areas and are discussed in the Technical Reference Document and delineated in the Resource Atlas.

The 7-day, 10-year low flow figure represents the lowest average flow over a consecutive 7-day period that is expected to recur at 10-year intervals. Most of the streams in the Coal Field have 7-day, 10-year low flows of 0.0 cfs. These tributaries typically cease to flow during low flow periods. Only the mainstem streams of the major basins and a few of their principal tributaries sustain a flow during low flow periods. KDNREP sets stricter criteria on certain effluents for lowflow streams than it does for permanent streams due to the low flow stream's inability to dilute contaminants. Water quality tends to be poorest at times of late summer low flow when dilution of contaminants is least and temperatures are highest. Acid mine drainage, raw sewage, and other contaminants are most harmful during this period when the lack of dilution can lead to fish kills in reaches far downstream from the source.

3.3.1.2 Quality of Surface Water Resources

Information on water quality in the surface waterways of the Eastern Kentucky Coal Field is sparse and is based on data from a widely spaced set of sampling stations that have been operated at various times by various agencies. The most comprehensive reports available are the basin-wide water quality management plans developed in accordance with Section 303(e) of the CWA during the mid-1970's. In general, these five basin-wide water quality management plans focus on organic pollution and sewage treatment needs rather than degradation caused by or resources susceptible to coal mining. Nevertheless, the basin plans provide considerable information on the water resources of the Coal Field. In addition, data on high quality streams of the Eastern Kentucky Coal Field are provided by the Kentucky Nature Preserves Commission (KNPC 1979).

The extent of water quality problems varies across the five basins. The Licking River Basin includes 1,390 square miles and 91% of the Basin is considered to have long-term water quality problems. However, surface coal mining activities (as of 1975) are reported to affect only seven square miles or less than 1%. Substantial mining activity has occurred, however, since 1975. The Big Sandy River Basin includes more than 2,000 square miles and the water quality limited classification has been applied to about 69% of the Basin. About half of the Big Sandy River Basin (1,037 square miles) is affected by acid mine drainage. In addition, surface mines and timbering contribute to widespread erosion and sedimentation. The Little Sandy-Ohio-Tygarts Creek Basin extends over 1,120 square miles with about 65% of the Basin having long-term water quality problems. The coal-affected areas include about 31% of the Basin. The Upper Cumberland River Basin constitutes the largest of the five and extends over 4,500 square miles. About 31% of this Basin is considered to have long-term water quality problems. The Kentucky River Basin includes more than 3,400 square miles and approximately 22% (778 square miles) are considered to have long-term water quality problems. Coal mining is estimated to affect about 83% of this Basin. Future mining activity will be concentrated primarily in the Kentucky and Big Sandy River Basins.

Water quality varies greatly across the Coal Field. Siltation and acid mine discharge from coal mines are the principal sources of stream pollution. Acid mine drainage (AMD) is the result of the oxidation of iron disulfide minerals, principally pyrite and marcasite, found in overburden, coal, and black organic shales. There also are discharges of "blackwater," waters laden with coal fines and related sediments during storm periods. The scattered monitoring data collected during the 1960's and early 1970's demonstrated various instances of low pH, high acidity, hardness, sulfates, iron, and dissolved solids. Iron, manganese, and fluoride concentrations were observed to exceed US Public Health Service (USPHS) drinking water standards. In many locales, mine acid discharges are neutralized by limestone and other carbonate minerals.

The Kentucky Nature Preserves Commission (KNPC) has noted that stream quality in the region is subject to rapid change because degradation can proceed quickly. Recovery from degradation is a slower process. In the Coal Field as a whole, 51 streams were labeled as high quality, 12 of which also had significant recreational use. The high quality streams are considered to be in or near their natural, unpolluted condition. Five other streams in the Coal Field were labeled as having significant recreational use. The greatest number of high quality streams was in the Upper Cumberland River Basin (35). The Kentucky River Basin had nine high quality streams; the Little Sandy-Ohio-Tygarts Creek Basin had five; the Licking River Basin had two; and the Big Sandy River Basin had one.

The KNPC (1979) identified streams with moderate water quality which were judged to be able to recover within a reasonable period of time if human perturbations were to cease. Half of the ten moderate quality streams in the Coal Field were in the Upper Cumberland Basin. The Kentucky Basin accounted for three, and there was one each in the Big Sandy and Little Sandy- Ohio-Tygarts Creek Basins. The earlier KNPC study identified 12 additional streams with moderately degraded biota, with at least one in each major basin.

3.3.1.3 Water Uses

The KDNREP Division of Water issues permits for the withdrawal of surface water from the streams of the Commonwealth. Data regarding these permits are computerized and updated periodically by KDNREP. The intake locations of these withdrawal points are indicated in the Resource Atlas. Surface water supplies may be dedicated to municipal, water district, institutional, or other uses. As of 15 November 1979, there were 40 active surface water withdrawal points, primarily municipal and water district users.

There are 32 publicly owned non-Federal lakes and reservoirs in the Eastern Kentucky Coal Field. Most serve a variety of purposes and in total they cover more than 2,400 acres.

3.3.2 Groundwater Resources

Groundwater is the principal source of potable water supply in many regions. For eastern Kentucky, groundwater use is presently limited to small domestic supplies. KDNREP has permitted 47 groundwater withdrawal points in the Coal Field. These are issued primarily to users with large water withdrawal requirements such as schools, institutions, municipalities, and water district users.

In the Eastern Kentucky Coal Field the groundwater table is commonly encountered within the first few tens of feet beneath the ground surface. Contaminants in acid mine drainage from coal and other mines are capable of locally degrading the groundwater supplies. The cumulative effect of coal mining in eastern Kentucky may be the degradation of this resource over broad areas.

3.3.2.1 Aquifers in the Region

The groundwater resources of eastern Kentucky occur in both consolidated and unconsolidated sediments. There are four principal sedimentary units in which aquifers occur in eastern Kentucky including: (1) Quaternary alluvium; (2) the Conemaugh and Breathitt Formations; (3) the Lee Formation; and (4) rocks of the Mississippian System (Figure 3.2-2). These formations also contain aquitards. The aquifers of the region are not continuous in their water yielding or water quality characteristics across the region due to depositional environment and erosion.

3.3.2.2 Groundwater Quality Characteristics

The chemical composition of the groundwater in the Eastern Kentucky Coal Field is variable. It is governed by the original chemistry of the water prior to its infiltrating into the subsurface, the amount of time it has been in contact with the rock or unconsolidated sediment, and the chemical characteristics of the strata through which it passes during its journey through the subsurface. The major objectionable chemical constituents of groundwater in the Eastern Kentucky Coal Field are iron, chloride, and hardness. Locally, total dissolved solids, sulfate, nitrate, fluoride, and acidity have been reported to be problems. The primary sources of iron and chloride are acid mine drainage and saline water, respectively.

Acid mine drainage is the principal water quality problem associated with coal mining in the region. AMD can consist of iron hydroxide, sulfuric acid, ferrous and ferric sulfates, and other acid salts. While these constitutents are normally added to groundwater at a very slow rate in the natural weathering processes, mining activity accelerates these natural processes to such an extent that the quality of subsurface waters undergoes substantial degradation.

Many surface streams in the Eastern Kentucky Coal Field have naturally acid waters. It is therefore very likely that the groundwater in some areas is also naturally acid and possibly contains relatively high concentrations of objectionable metals. The problem with coal mining in these areas is that the mining activities may increase the rate of exposure of acid producing materials which may in turn increase the rate of AMD production.

Acid mine drainage is dependent upon several factors:

- The availabilty of air, water, and iron disulfide minerals and the length of time water is in contact with the minerals;
- Hydrologic, geologic, and topographic features of the surrounding terrain and the placement of the mine with respect to them;
- The type of mining method employed and whether the mine is operationally active or inactive; and
- The influence of micro-organisms of pyrite oxidation (Appalachian Regional Commission 1969).

Sources of acid mine drainage include but are not limited to deep mines, strip mines, spoil piles, slurry ponds, auger holes, and exploratory drill holes. Groundwater contamination results when water with high concentrations of the products of AMD migrate into the groundwater reservoir. Water with greater concentrations of iron may affect food processing and favor the growth of iron bacteria which can clog water transmission lines and drainage systems.

Saline water in some areas of the Eastern Kentucky Coal Field is responsible for high chloride concentrations in groundwater obtained from Pennsylvanian and Mississippian rocks. Chloride salts in large enough concentrations may make the water unpotable and objectionable for various specialized industrial uses of water. The presence of chloride affects not only the quality but also the quantity of fresh water resources recoverable from the aquifers. The boundary between fresh and salt water is called the fresh-saline water interface. The interface is not a place but a zone of varying thickness ranging from less than 100 feet (throughout most of Kentucky) to greater than 500 feet in parts of the Blue Grass region.

Two principal sources of saline water contamination in the upper aquifers are unplugged oil and gas wells extending into the Mississippian marine sediments and saline wastewater from oil recovery operations discharged at the surface and infiltrating into the groundwater. Coal mining activities are not expected to contribute to chloride contamination of groundwater, except possibly where the combination of coal mining and oil and gas production creates failure of properly designed oil and gas wells.

3.4 BIOLOGICAL RESOURCES

This section summarizes information generated by the Kentucky Nature Preserves Commission on the biological resources of the Eastern Kentucky Coal Field which was published in the KNPC report entitled Eastern Kentucky Coal Field: Preliminary Investigation of Natural Features and Cultural Resources (KNPC 1979) which include the following volumes:

Volume I	Introduction and the Natural Heritage Program
Volume II	Ecology and Ecological Features of Eastern Kentucky
Volume III	Caves and Associated Fauna of Eastern Kentucky
Volume IV	Geologic Diversity of Eastern Kentucky
Volume V	Cultural Resources of Eastern Kentucky and Cultural Resources Overlay Index
Volume VI	Water Resources and Natural Features Overlay Index

3.4.1 Vegetation

The flora of eastern Kentucky generally is similar to that of the Allegheny Mountains (Braun 1937). Eastern Kentucky is a floral overlap zone representing an area where many northern and southern species ranged, but are now found only as disjuncts. These disjuncts remain as a function of the diverse topographic and edaphic features of the region which provide local habitats and suitable environments for both northern and southern species. These local habitats include regions of elevational extremes (i.e., deep gorges to mountains), moisture extremes, and cool areas at cave mouths. A few examples of these species which are now disjunct in suitable habitats of eastern Kentucky include: mountain maple; beard grass; black-seeded rice grass; and American yew.

Species with Coastal Plain affinities compose another interesting assemblage of plants well-represented in the Cumberland and Allegheny Plateaus, especially near the western margin. Clues to the probable vegetational history of this area are provided by those relict species which are well-represented in a number of species, but occur on an infrequent basis. A few of these Coastal Plain species found in the Cumberland Plateau include: bushy beard grass; screw grass; Virginia willow; and primrose-leaved violet.

Limestone outcroppings allow certain species (calciophiles) which require a limestone habitat to become part of the local floral assemblage. Typical examples include wall-rue spleenwort, oblong-leaf aster, blue ash, and yellow oak. In addition, several species which are endemic to small areas (i.e., Cumberland rosemary, Lucy Braun's white snake root, and mountain lover) or are limited in distribution to rockhouses and the like have been classified as rare by the KNPC.

3.4.2 Wildlife

Kentucky's central location in the eastern United States and its physiography allows for an admixture of northern and southern faunal components reflecting the diversity of the eastern United States fauna. The richest fauna in Kentucky is found in the Appalachian Plateaus Province (Figure 3.2-1). Barbour and Davis (1974) have established that mammal species representative of boreal, temperate, and tropical climates are found in the Province. The three geographic patterns are exemplified respectively by Gapper's red-backed vole, muskrat, and golden mouse. Different optimum temperature requirements for different species is partially responsible for these geographic patterns (Hall and Kelson 1959). Table 3.4-1 indicates that within the Province two mammalian faunal assemblages are represented. The skew towards the northern species can be explained by the generally mountainous terrain and mean annual temperature of the Plateau.

The ichthyofauna of central Appalachian drainages comprises approximately 277 native freshwater species distributed among 22 families (Jenkins et al. 1971). Five families are predominant in the central Appalachian region's fauna; minnows; suckers; catfishes; sunfishes; and perches.

The rivers of eastern Kentucky harbor a fairly diverse fauna. Stream modifications in this unglaciated region have been numerous and are reflected in the distribution of certain of the region's fish. For example, Miller (1968) theorized that the Kentucky River population of the greenside darter either gained access to the system through stream capture from the Cumberland River or that the stream capture allowed gene flow between the two populations. Kuehne and Bailey (1961) documented a Cumerland-Kentucky headwater exchange which in part explains the present distribution of the arrow darter. Drainage exchanges between the Cumberland and Tennessee Rivers in the Cumberland Gap vicinity of Kentucky are discussed by Ross (1971). The strong faunal resemblances of the Tennessee and Cumberland Rivers are depicted in Jenkins et al. (1971) and Starnes et al. (1977) lend further support for drainage exchange.

The presence of Cumberland Falls on the Cumberland River is a classic example of an instream barrier limiting fish dispersal. The ichthyofauna above the Falls is represented by approximately 30 forms in contrast to 150 forms below. A detailed discussion of the development of the fauna is given in Jenkins et al. (1971). The zoogeography associated with drainage evolution in the eastern Kentucky region is quite complex and far from being understood. Numerous geological, climatic, and hydrological events have been interacted to produce a perplexing and enigmatic distribution of fish species.

Table 3.4-1. Species of mammals occurring in the Appalachian Plateaus Province of Kentucky that exhibit northern or southern affinities (Barbour and Paris 1974).

NORTHERN SPECIES	
Sorex cinereus	masked shrew
S. fumeus	smokey shrew
S. dispar	long-tailed shrew
Parascalops breweri	hairy-tailed mole
Myotis leibii	small-footed Myotis
Sylvilagus transitionalis	New England cottontail
Peromyscus maniculatus nubiterrae	cloudland deer mouse
Clethrionomys gapperi	Gapper's red-backed vole
Microtus pennsylvanicus	meadow vole
M. ochrogaster	prairie vole
Synaptomys cooperi	southern bog lemming
Zapus hudsonius	jumping mouse
Napaeozapus insignis	woodland jumping mouse
SOUTHERN SPECIES	
Plecotus rafinesquii	Rafinesque's big-eared bat
Oryzomys palustris	rice rat
Reithrodontomys humulis	eastern harvest mouse
Ochrotomys nuttalli	golden mouse
Sigmodon hispidus	hispid cotton rat
Neotoma floridana	eastern woodrat

The Province can be thought of as a refugium of biological repository. Hubbard (1971) states that a probable massive invasion of the southern Appalachians by northern fauna transformed these mountains into a major refugium for boreal biota. Paleontological evidence shows that some of the small mammals of the Province were more widely distributed in the State than at present (Guilday et al. 1971). An example of this is Microsorex thompsoni (Thompson's pigmy shrew) which has been found in cave deposits in Woodford County with the Interior Low Plateaus (Guilday et al. 1971). These deposits date to the Pleistocene and are approximately 13,000 years old. At that time, the climate of Kentucky was much colder due to the glacial advance. Microsorex thompsoni at present is a species of northern affinities and is only known from the Province at high elevations (610 m or 2,000 feet). Other mammal species in the Woodford County (Welsh Cave) deposits with northern affinities were Sorex palustris (water shrew) and Microtus chrotorrhinus (yellow-nosed vole).

Diversity of the fauna is reflected by the percentage of vertebrate species in Kentucky represented in the Province. The lowest percentage is 57% and the percentage of all the vertebrates of the State represented in the Province is 77%. These figures connote the great faunal diversity of the Province. This diversity is reflected in the salamanders. Of the salamanders that occur in Kentucky, 84% are found in the Province. One species, Black Mountain salamander, is endemic to the Province and probably evolved in this area of Kentucky (Caldwell and Trauth, in press). The largest complement of salamander fauna is contained within the family Plethodontidae (lungless salamanders). Dunn (1926) has postulated the evolution of this family and placed its origin in the Blue Ridge Physiographic Province in the southern Appalachians. Since the evolution of the family, much adaptive radiation has occurred due to the adaptive zones available (Wake 1966). These can be thought of as diversity zones, and the fact that such a large complement of plethodontid species inhabit the Province is evidence of the diversity of habitat present there. Studies into centers of dispersal for crayfish species (Hobbs 1969) reveal this important biological phenomenon in the fauna of the Province. Hobbs (1969) believes the Province to be the ancestral home and center of dispersal for the following genera of crayfish: Cambarus; Orconectes; Hobbeus; Faxonella; and Fallicambarus. The number of endemic species of crayfish is high in this area (Hobbs 1969). This again underscores the zoological contribution of the Province.

3.4.3 Threatened and Endangered Species

Tables 3.4-2 and 3.4-3 summarize the status of the animal and plant elements in the Eastern Kentucky Coal Field. The element list should not be considered finalized since it is a dynamic document reflecting the most current information. Elements listed are continually monitored and their status updated. All animals on the list are provided with their scientific name, common name, and an element code number which corresponds to the Water Resources and Natural Features Overlay of the Resource Atlas and files kept on that species at the Kentucky Nature Preserves Commission. Those elements which are not known within the study area are also listed. They have not been given a Kentucky status as they will be dealt with in much greater detail in further studies conducted by the Kentucky Nature Preserves Commission.

3.4.4 Critical Natural Areas

Interpreted critical areas, either known or high potential areas, were defined by KNPC as those resources that were considered to be irreplaceable or highly significant. Information on "known critical areas" concerns those areas that are considered irreplaceable resources. "High potential critical areas" are considered to be highly significant resources including sites managed as multiple use areas. For the purposes of evaluating New Source mining applications in the sensitive ecosystem, surface water, and wetlands categories, critical areas include:

- Stream segments designated or proposed for designation by KDNREP as coldwater aquatic habitat;
- Stream segments designated or proposed for designation by KNDREP as an outstanding resource water;

Table 3.4-2. Summary of special categories of Kentucky animal element status as determined by KNPC (officially listed Federal species are indicated in parentheses; KNPC 1979).

Status	Pelacypod	Gastropod	Crustacean	Fish	Amphibian	Reptile	Bird	Mammal	Total
Endangered	11 (2)	0	2	6	0	0	2 (2)	7 (3)	28
Threatened	0	0	0	9(1pt*)	1	1	0	3	14
Special Concern	1	0	0	26	2	3	0	2	34
Undetermined	2	0	0	5	0	3	17	8	34
Total	14	0	2	46	3	7	19	20	111

*pt = "proposed" threatened species (Official Federal designation)

Table 3.4-3. Summary of the status of terrestrial plants in the Eastern Kentucky Coal Field as determined by KNPC (those in parentheses are listed in the Smithsonian report; KNPC 1979).

Status	Special Pteridophyte	Special Gymnosperm	Special Monocot	Special Dicot	Total
Endangered	3	—	4	27 (2)	34
Threatened	1	1	13 (5)	28 (8)	43
Special Concern	—	1	2	4	7
Undetermined	1	—	5	7	13
Total	5	2	24 (5)	66 (10)	97 (15)

Habit	
Annuals	6
Biennials	1
Porrenial Herbs	70
Saprophytes	1
Vines	1
Shrubs	13
Trees	5
Total	97

- Stream segments identified as a Sensitive Aquatic Ecosystem by KNPC;
- Stream segments identified as a high or moderate water quality stream by KNPC;
- A Sensitive Terrestrial Ecosystem designated by USEPA or USFWS and identified by KNPC;
- A fish and wildlife habitat identified by KDNREP-Fish and Wildlife Division; and
- Wetlands.

Coldwater aquatic habitats and outstanding resource waters are defined by the KDNREP (Surface Water Resources Task Report). In addition, KNPC defines the following:

- High quality stream. Stream in or near a natural, unpolluted condition.
- Moderate quality stream. Streams able to recover within a reasonable period of time if human perturbations were to cease.
- Sensitive aquatic ecosystem. All streams designated or proposed for designation as outstanding resource waters including but not limited to unique floral and/or faunal assemblages; unique and/or representative examples of natural flora and fauna; and/or water quality characteristics of a given physiography, hydrologic, or topographic unit; and/or a habitat necessary for the continued state existence of a species or a group of species.
- Sensitive terrestrial ecosystem. All areas designated or proposed for designation as a public park, National Park, National Wildlife Refuge, State wildlife management area, State or National Forest, National System of Trails, Wilderness Area, National Natural Landmark, Rare II area, Nature Preserves, land owned by private conservation organizations, university owned natural areas, and areas where rare plant and animal elements occur. In addition, areas identified by KNPC as special geologic areas, karst areas, and Ecological Areas are included.

As a result of the KNPC study, certain environmentally sensitive areas have been designated as High Potential Critical Areas (HPCA) or Known

Critical Areas (KCA). A map depicting the general location of these sensitive aquatic and other natural resources of the Eastern Kentucky Coal Field is included as Figure 3.4-1. These areas are indicated in detail in the USEPA Resource Atlas.

3.5 LAND RESOURCES

The Eastern Kentucky Coal Field comprises 38 counties and includes approximately one-fourth of the total area of the Commonwealth. The topography of the Coal Field is primarily mountainous and drains into five major river basins. Coal, timber, and agricultural products are the major economic land resources derived from the Coal Field. More than one-half of the coal produced in the Commonwealth originates from the Eastern Kentucky Coal Field. Commercial timber also is a major industry while agricultural production is the least productive of the three dominant industries (Karan and Mather 1977).

The land use pattern of the Coal Field (Figure 3.5-1) is characterized by broad expanses of silvicultural (forest) area interspersed with agriculture in the river valleys and plateau regions. Urban land uses are concentrated primarily in the northern portions of the region along the Kentucky-Ohio border between Portsmouth and Ashland. Mining activity is a major economic land use in the southeastern half of the Coal Field.

3.5.1 Forestry

The forest product industry is an important element of the economy of Kentucky. Approximately 18,000 people are employed by the forest industry in the Commonwealth accounting for an annual payroll of more than $100 million. The majority of Kentucky's commercial forests are located within the Eastern Kentucky Coal Field (Karan and Mather 1977). Approximately 80% of the total land area of eastern Kentucky is forested (Karan and Mather 1977). Much of this land is utilized for the commercial production of timber. While 16 counties have more than 80% of their land area devoted to

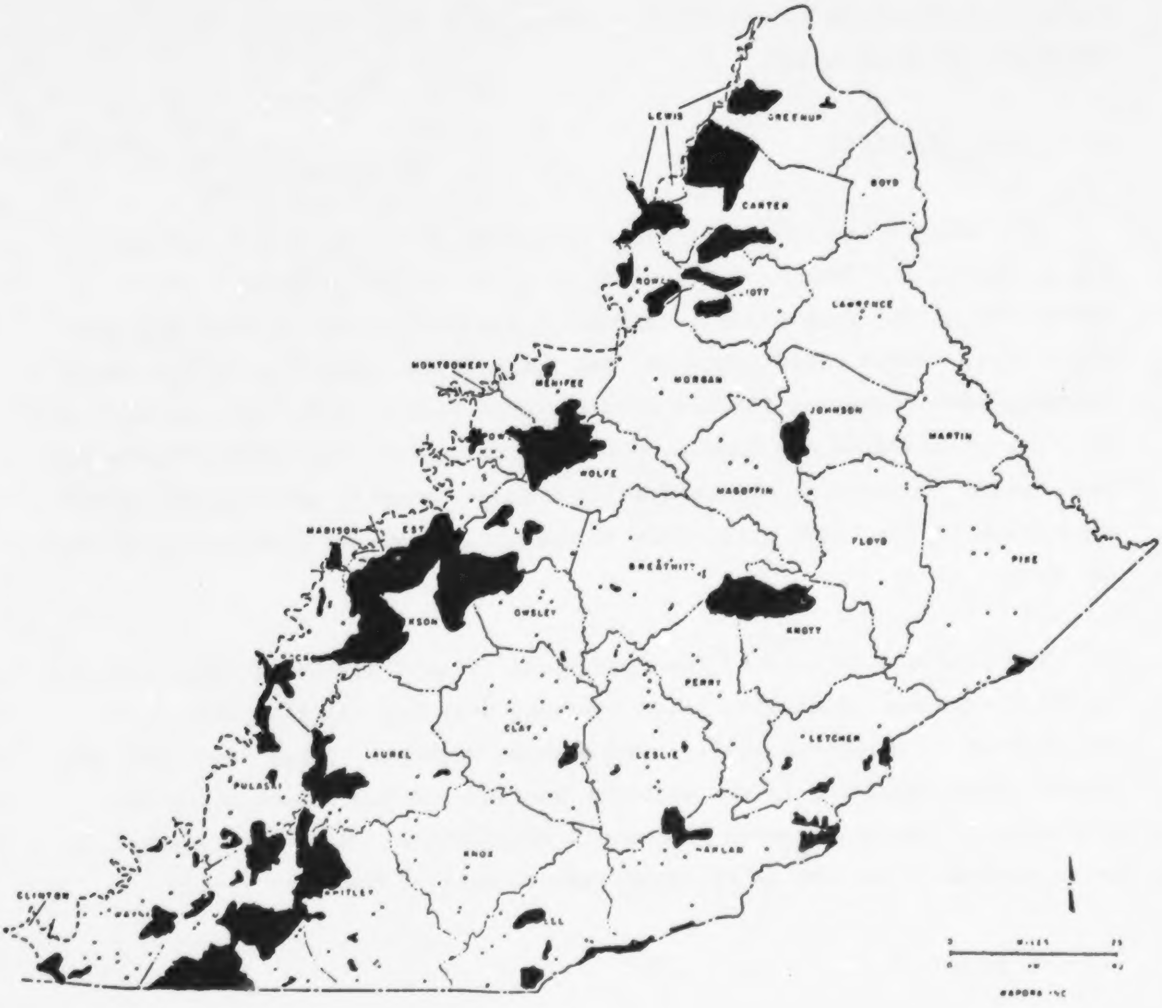

LEWIS
GREENUP
BOYD
CARTER
LAWRENCE
MONTGOMERY
MENIFEE
MORGAN
JOHNSON
MARTIN
WOLFE
MAGOFFIN
MADISON
FLOYD
PIKE
BREATHITT
OWSLEY
KNOTT
PERRY
CLAY
LAUREL
LETCHER
LESLIE
PULASKI
HARLAN
KNOX
CLINTON
WAYNE
WHITLEY
MAPORS INC

Figure 3.4-1. Sensitive aquatic and other natural resources of the Eastern Kentucky Coal Field (based on mapping by the Kentucky Nature Preserves Commission 1978).

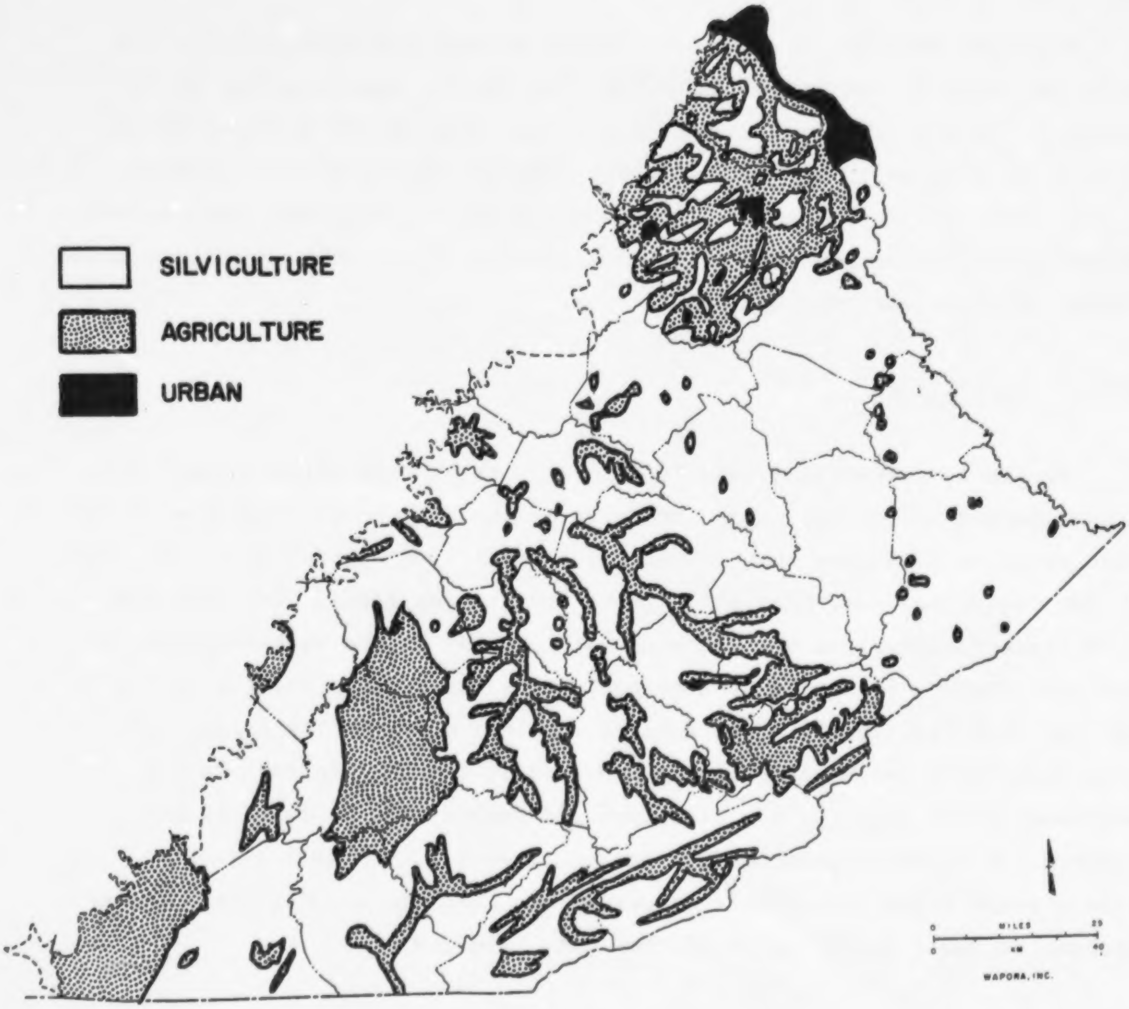

SILVICULTURE
AGRICULTURE
URBAN
0 MILES 25
0 KM 40
WAPORA, INC.

Figure 3.5-1. Generalized land use in the Eastern Kentucky Coal Field.

commercial forests, only Floyd and Boyd Counties have less than 60% of their land area in commercial forests.

A slight decrease in the total forest acreage has occurred over the past ten years in the Eastern Kentucky Coal Field. Approximately 40,000 acres of forests have been converted to other uses during the past decade within the five major river basins that comprise the Coal Field (KDNREP n.d.). New uses for the once forested areas include cropland, pastureland, highways, urban development, power lines, reservoirs, and to an undetermined extent, surface coal mining.

3.5.2 Agriculture

Cropland, pastureland, and land for livestock production account for approximately 16% of the total land area of the Eastern Kentucky Coal Field. Most counties have less than 45% of their total land devoted to farms. Only Elliot County has more than 65% of its land area as farms. The counties with higher proportions of farm area mainly occur on the western border of the Coal Field. In the Eastern Kentucky Coal Field, most farming income is derived from the production of tobacco and beef cattle. The primary cash crop is tobacco which generally is produced in the western and central portions of the Coal Field. Livestock and poultry are produced in the eastern and southern counties. Farms in classes 1 through 5 also are concentrated along the western border of the Coal Field. Classified farms produce at least $2,500 worth of commodity annually.

The majority of counties have from 1.0% to 3.4% of the land devoted to harvested crops. The counties located on the western border of the Coal Field show a greater tendency toward commercial agriculture than the other counties of the Coal Field. The commercial crops and products produced in eastern Kentucky include tobacco, corn, soybeans, hay, wheat, and pastureland.

Trends in farm activity in eastern Kentucky from 1969 through 1974 show a decline in the total number of farms and total acreage devoted to farming

(USDOC 1975). The loss of agricultural acreage occurred in each county in the Coal Field. The general decrease of agricultural lands in the Coal Field has continued beyond 1974. The small farming operations that are characteristic of agriculture in the Coal Field are vulnerable to economic pressures including crop prices and competitive land uses. As a result, many small farms produce commercial lumber as an income supplement (Karan and Mather 1977). Eventually, these farms discontinue agricultural production in favor of commercial lumber operations as economic conditions reduce the profit margin on agricultural products.

The USEPA recognizes several categories of agricultural land as worthy of protection from conversion to non-farm land uses. These lands, known as Environmentally Significant Agricultural lands, include prime farmland; unique farmland; additional farmland of statewide importance; additional farmland of local importance; farmlands in or contiguous to Environmentally Sensitive Areas; farmlands of waste utilization importance; and farmlands with significant capital investments in Best Management Practices (BMP's). Of these farmland types, only prime farmlands have regulatory significance under SMCRA.

Prime farmland is that land which has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. To qualify as prime, the farmland must be available for agricultural uses. Such lands include cropland, pastureland, rangeland, forest land, and other open lands. Urban areas and water, however, cannot qualify as prime farmland. Prime farmland in eastern Kentucky generally occurs in valley bottoms, higher terraces, and gently rolling ridgetops. The US Department of the Interior (USDI) definition of prime farmland excludes steeply sloping, erodible terrain (30 CFR 716.7; 42 FR 239: 62693 - 62695). This restriction effectively limits prime farmlands in eastern Kentucky to slopes less than 10%. Less than 6% of the total land area in the Coal Field is defined as prime farmland.

3.5.3 Recreational Land

The major areas of the Eastern Kentucky Coal Field which are classified as recreational lands include that land in the Daniel Boone National Forest, the Jefferson National Forest, Beaver Creek National Wilderness Area, the Cumberland Gap National Historic Park, the Big South Fork Cumberland River National River and Recreation Area, and various State parks.

The Daniel Boone National Forest is located in parts of 21 counties in the western and south-central portion of the Eastern Kentucky Coal Field. Approximately one thousand square miles of rugged, mostly forested land comprise this National Forest. The Forest provides land for conservation and recreation for the population of the region and also provides land for timber production, mining, and other commercial activities. Coal mining has occurred in most of the counties that are encompassed by the Daniel Boone National Forest. Surface coal mining activity in the past quarter century has been concentrated in Leslie, Whitley, Bell, and Laurel Counties (Currens and Smith 1977). Underground mining has also taken place in many of the counties that are encompassed by the Forest. Most underground coal mining has been in Leslie, Bell, and Harlan Counties. With the exception of seven counties, all of the remaining counties have seen some amount of underground mining since the middle of this century (Currens and Smith 1977).

Surface ownership is held by the Federal government for all land within the Daniel Boone National Forest. Mineral ownership is held by both private parties and the Federal government. Approximately 32,823 acres of land have partial mineral ownership while approximately 15,570 acres of mineral rights are owned privately but will return to Federal ownership at a predetermined expiration date. Private ownership of mineral rights are held for 409,688 acres and will not revert to Federal ownership.

The Jefferson National Forest is located on the eastern edges of Pike and Letcher Counties in eastern Kentucky. Both surface and underground mining take place in the Jefferson National Forest with surface mining predominant.

Ten State recreational facilities serve the residents of the Eastern Kentucky Coal Field. These facilities include: (1) Natural Bridge State Park; (2) Levi Jackson Wilderness Road State Resort Park; (3) Grayson Lake State Resort Park; (4) Greenbo Lake State Resort Park; (5) Carter Caves State Resort Park; (6) Pine Mountain State Resort Park; (7) Jenny Wiley State Resort Park; (8) Buckhorn Lake State Resort Park; (9) Cumberland Falls State Resort Park; and (10) Kingdom Come State Resort Park.

3.5.4 Urban Land

Urban land uses are concentrated primarily in the northern areas of the Eastern Kentucky Coal Field. The heaviest urban concentrations occur along the Kentucky-Ohio border between Portsmouth and Ashland. This land along the Ohio River is more heavily industrialized than any of the other parts of the Coal Field. The other four river basins include only scattered, isolated urban areas.

The urban system in the Eastern Kentucky Coal Field is neither well developed nor possesses the attributes which would indicate a significant potential for urbanization in the future. A heavy reliance on primary economic activities such as coal mining and lumbering may be the reason. Only 137,879 persons comprising 18.2% of the total population live in urban areas of 2,500 people or more. Compared to the 1970 nationwide average of over 70%, eastern Kentucky is sparsely urbanized (USDOC 1978).

Eastern Kentucky exhibits a stream-oriented distribution of urban areas. The service areas or hinterlands of the larger urban settlements such as Ashland, Middlesboro, and Somerset extend upstream into mountainous areas. Towns decrease in size toward the mountains and the interior valleys of the Coal Field. Hence, the hierarchically ordered system of eastern Kentucky's cities and towns mirrors the hierarchically ordered stream network of the Ohio-Big Sandy, Kentucky, and Cumberland drainage basins (Blome 1970). Most towns are situated in the crescent-shaped area that extends from Ashland, south toward Middlesboro, and west toward Somerset (Figure 3.5-2).

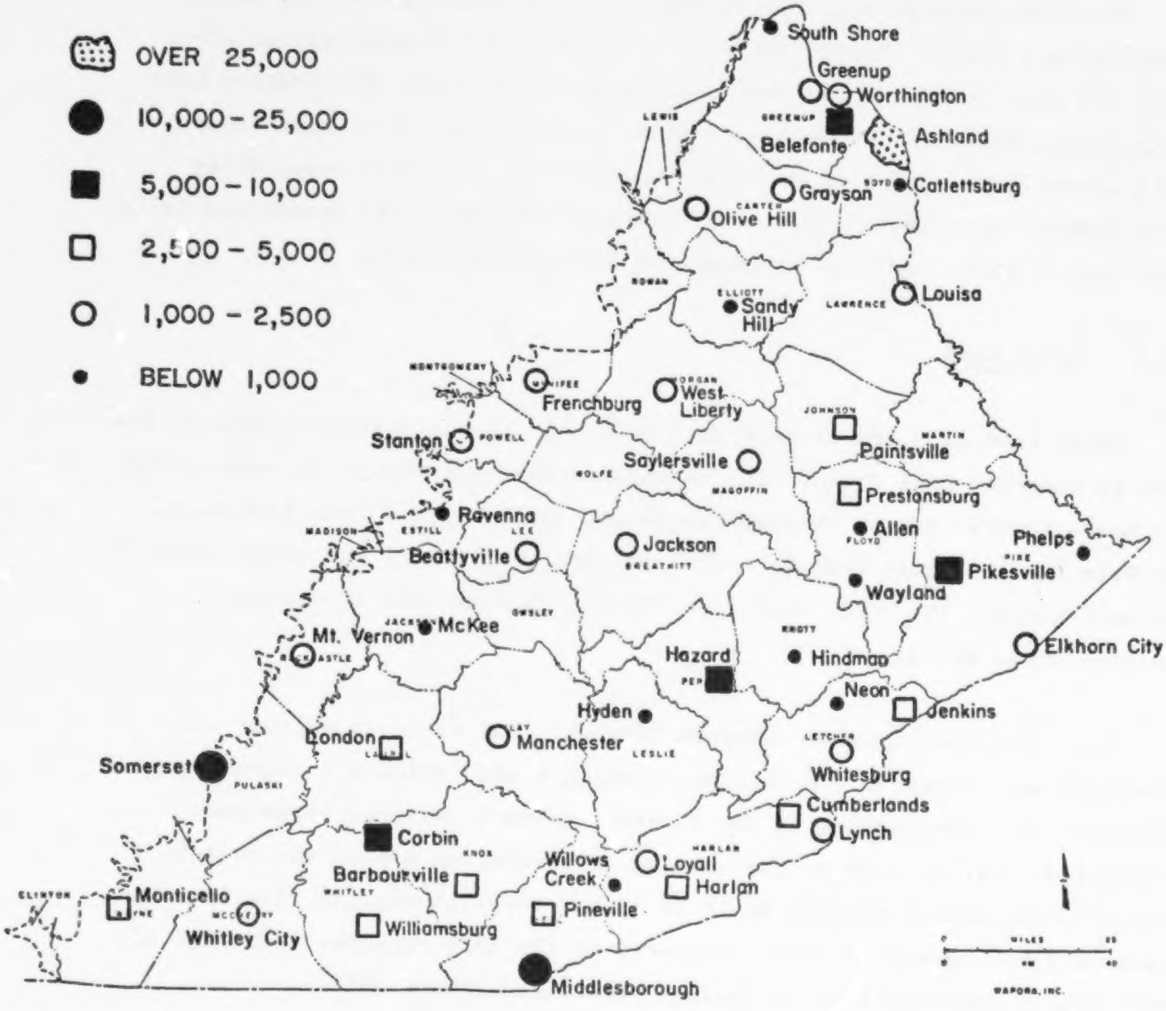

OVER 25,000
10,000 - 25,000
5,000 - 10,000
2,500 - 5,000
1,000 - 2,500
BELOW 1,000
South Shore
Greenup
Worthington
Belefonte
Ashland
Grayson
Catlettsburg
Olive Hill
Louisa
Sandy Hill
Frenchburg
West Liberty
Stanton
Paintsville
Saylersville
Prestonsburg
Ravenna
Allen
Jackson
Beattyville
Phelps
Pikesville
Wayland
McKee
Mt. Vernon
Elkhorn City
Hazard
Hindman
Neon
Jenkins
Hyden
London
Manchester
Somerset
Whitesburg
Cumberlands
Lynch
Corbin
Willows Creek
Loyall
Barbourville
Harlan
Monticello
Whitley City
Pineville
Williamsburg
Middlesborough
LEWIS
GREENUP
BOYD
CARTER
ROWAN
ELLIOTT
LAWRENCE
MONTGOMERY
MENIFEE
MORGAN
JOHNSON
MARTIN
POWELL
WOLFE
MAGOFFIN
MADISON
ESTILL
LEE
FLOYD
PIKE
BREATHITT
OWSLEY
JACKSON
KNOTT
PERRY
LETCHER
LESLIE
CLAY
LAUREL
PULASKI
KNOX
HARLAN
WHITLEY
CLINTON
WAYNE
MCCREARY
MILES
WAPORA, INC.

Figure 3.5-2. Population of urban and semi-urban areas in the Eastern Kentucky Coal Field.

3.6 HUMAN RESOURCES

The population of eastern Kentucky entered a period of steady economic and population decline beginning in 1950. This decline ended in the early 1970's. It was followed by an increase in mining activity and a population in-migration that has continued to date. By 1976, the population of the Eastern Kentucky Coal Field amounted to about 760,000 persons or 30% of the population of the Commonwealth of Kentucky.

The existing population distribution and transportation network has been greatly influenced by stream patterns and associated topographic features (Blome 1970). The inhabitants either reside in small, densely settled communities that extend along the bottom of narrow river valleys or in scattered rural communities perched on steep mountain slopes (Langman 1971).

3.6.1 Socioeconomic Conditions

Overall socioeconomic conditions in the Coal Field of eastern Kentucky have improved markedly during the past several years. The renewed interest in coal has initiated almost a full decade of increased employment and population within most of the Coal Field counties. A large part of this growth is a result of in-migration. Attracted by the employment opportunities and the higher wages of the coal mining industry, many new and displaced miners and their families have moved into the towns and settlements of eastern Kentucky. Except in the largest cities (e.g., Ashland, Middlesboro, and Somerset), the coal mining industry is the primary and almost exclusive economic base for eastern Kentucky. This strong association with coal mining has proven to be beneficial in raising the living standards of eastern Kentucky residents in recent years. However, the lack of diversification in the economy could lead to serious problems in the future should the present strong demand for coal be reversed.

The 12,366 square mile area of eastern Kentucky had a total population of 759,398 in 1976. The population density for the entire area was 61 persons per square mile. The density varied from 332 persons per square mile in Boyd County to less than 25 persons per square mile in Menifee County. However, as the population density provides only a general picture of population distribution, a more realistic approach to population density in this deeply dissected plateau region would be to compare the county populations to the amount of land that has already been developed or has the potential for future development. The difficult terrain coupled with the existing pattern of land ownership renders less than 10% of all land as suitable for development, thereby increasing the actual population density tenfold. Pike County, for example, has an effective density approaching 800 persons per square mile because of the lack of developable land.

The existing demographic pattern of the Coal Field is most easily understood in the context of the net migration pattern. Prior to the early 1970's, net migration in eastern Kentucky was strongly negative because of the decreasing priority placed on the utilization and mining of coal and the higher economic growth experienced by industrial areas in the northeast and midwest. Shortly after 1970, but before the 1973 energy supply problems became acute, this migration trend was reversed and in-migration replaced out-migration. Between 1970 and 1977, the Coal Field experienced an average in-migration of 9.3%. The major coal mining counties (Bell, Breathitt, Floyd, Harlan, Johnson, Knott, Leslie, Letcher, Martin, Perry, and Pike) experienced a higher in-migration rate (10.1%) than the minor coal mining counties (7.6%).

3.6.2 Transportation

The Eastern Kentucky Coal Field suffers from transportation inadequacies that are responsible for significant, negative spillover effects in terms of regional development and diversification. The deeply dissected, forested plateaus of the Coal Field have caused major transportation corridors to locate outside the region or to follow alignments through major valleys. Throughout large areas of the Coal Field, there is a lack of extensive valley systems suited for the construction of major transportation corridors (Preston 1970). A substantial amount of eastern Kentucky's coal is transported in trucks that carry up to 80,000 pounds on State and county maintained roads. Two Interstate highways, I-64 and I-75, cross only the northern and southwestern sections of the Coal Field. Limited access toll roads include the Mountain Parkway, the Daniel Boone Parkway, and a small portion of the Cumberland Parkway. These highways play a significant role in coal transportation and accommodate substantial amounts of the interregional traffic between the Midwest and South and the mid-Atlantic seaboard and Midwest.

Most coal in eastern Kentucky is transported by freight train. Eastern Kentucky's busiest rail lines include the Paintsville Line operated by the Chessie System, the Whitesburg line operated by the Louisville and Nashville Railway, the Southern, the Norfolk and Western, and the Kentucky and Tennessee (Figure 3.6-1). The Paintsville and Whitesburg lines serve the major coal producing counties. They transport 20-40 million gross-tons/mile (Karan and Mather 1977; KDOC 1977) which is most of the coal for urban and industrial centers, ports, and power plants in the Northeast, Midwest, and South. These trunk lines support a branch-like system of feeder lines that ascend the many close-ended coal mining valleys located in the headwaters of river basins.

3.7 CULTURAL RESOURCES

3.7.1 Cultural Resources Inventory

The Kentucky Nature Preserves Commission obtained the locations of all documented historic and prehistoric archaeological sites and historic structures (cultural resources) in the Eastern Kentucky Coal Field from files of the Kentucky Heritage Commission in Frankfort, Kentucky and the

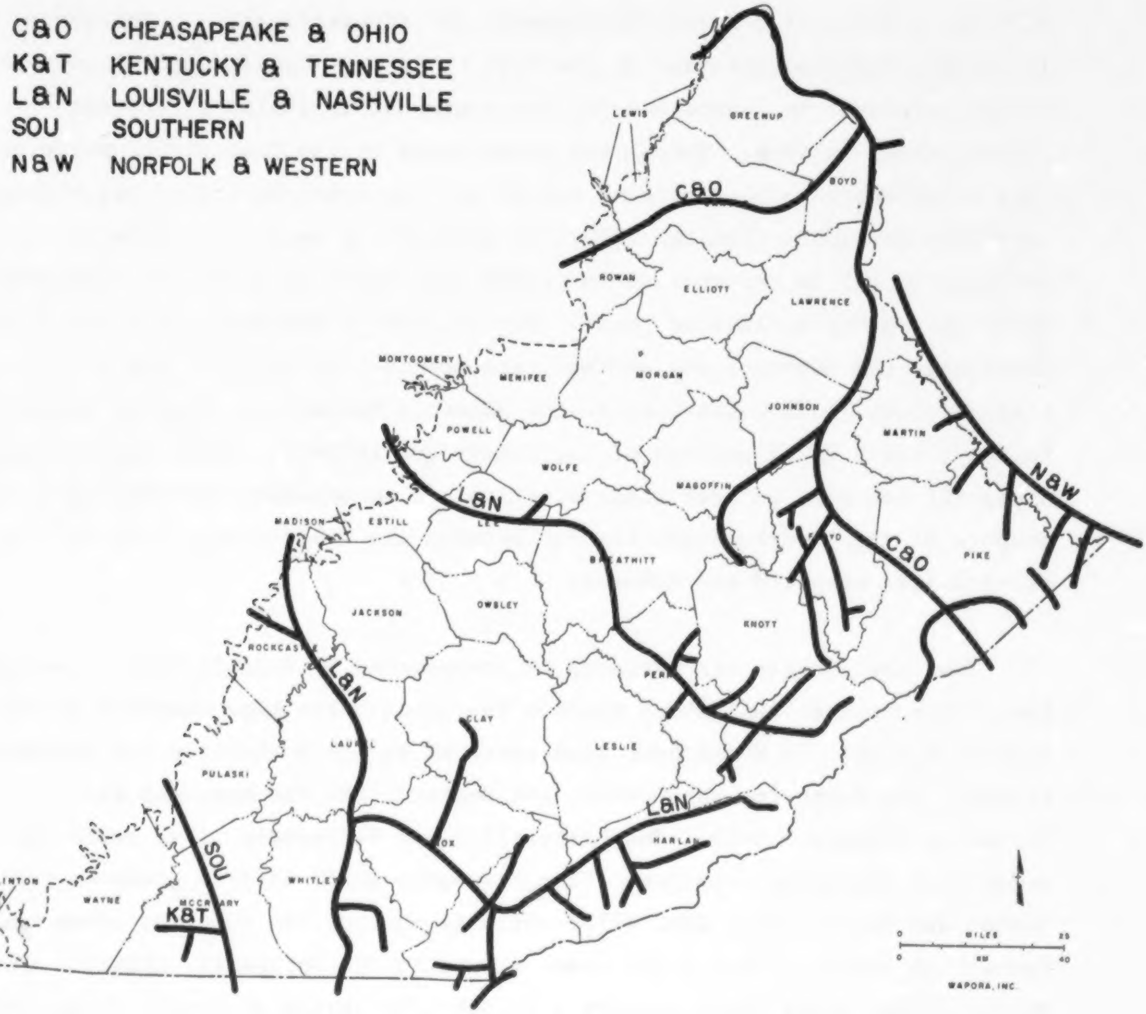

C&O CHEASAPEAKE & OHIO
K&T KENTUCKY & TENNESSEE
L&N LOUISVILLE & NASHVILLE
SOU SOUTHERN
N&W NORFOLK & WESTERN
LEWIS
GREENUP
BOYD
C&O
ROWAN
ELLIOTT
LAWRENCE
MONTGOMERY
MENIFEE
MORGAN
JOHNSON
POWELL
WOLFE
MARTIN
N&W
MAGOFFIN
L&N
MADISON
ESTILL
LEE
BREATHITT
C&O
PIKE
JACKSON
OWSLEY
KNOTT
ROCKCASTLE
L&N
PERRY
CLAY
LAUREL
LESLIE
PULASKI
L&N
HARLAN
SOU
KNOX
WHITLEY
CLINTON
WAYNE
MCCREARY
K&T
0 MILES 25
0 KM 40
WAPORA, INC.

Figure 3.6-1. Principal railroad routes in the Eastern Kentucky Coal Field. (KDOC 1976).

office of the State Archaeologist in Lexington, Kentucky. This inventory of sites is representative of the known cultural resource data base as of February 1979, but it is considered by KNPC to be neither exhaustive nor representative of the total number of cultural resources in the Eastern Kentucky Coal Field. The results of the KNPC study were summarized in an October 1979 Technical Report (Harker and Sanders 1979) to the USEPA.

Altogether, 1,631 known archaeological sites and 357 historic properties in the Coal Field were mapped on 234 USGS topographic quadrangle maps. The KNPC report also lists these known occurrences by quadrangle. The degree of significance was indicated for those sites which were: (1) listed on the National Register of Historic Places; (2) determined eligible for the National Register; (3) approved by the State Review Board but not placed on the National Register; or (4) considered potentially eligible for the National Register by the State Historic Preservation Officer but not yet submitted to the State Review Board. These data can be used by USEPA during its regional prioritization and permit review process, but they are no substitute for site-specific permit data.

In order to provide a more useful method of identifying and protecting cultural resources, attempts have been made to develop predictive models of site locations and densities (Dincauze 1978; D'Elia and Douglas n.d.; Lewis and Murphy 1978). At present, an insufficient number of systematic surveys have been conducted in Kentucky to develop reliable predictive models of site locations and densities. Until data collected with a systematic controlled framework are available, only a rough estimate may be made of relevant variables which might predict where historic and archaeological sites probably will occur in the Eastern Kentucky Coal Field (Harker and Sanders 1979). No mechanism is available for assessing areas where no cultural resource surveys have been conducted or landforms for which no sites have been reported.

3.7.2 Prehistory and History of Eastern Kentucky

The first evidence of human habitation in eastern Kentucky related to the Paleo-Indian period, perhaps as far back as 14-15,000 years ago. Sites from this period have been discovered in the Cumberland drainage of the Eastern Kentucky Coal Field. The Archaic period follows the Paleo-Indian with sites dated approximately 8,000 years ago. Archaic sites are found frequently in rockshelters and on hilltops and have been found throughout eastern Kentucky. The Woodland period, which began roughly 3,000 years ago, is known for its earthen "burial" mounds. Sites from this period have produced pottery and indications of the beginnings of the practice of horticulture. The Fort Ancient period began around 1000 years ago and is the most recent prehistoric period in eastern Kentucky. It is characterized by the rise of villages and maize cultivation. The beginning of the historic period in eastern Kentucky is marked by the earliest European contact in this area.

3.8 AIR QUALITY AND NOISE

3.8.1 Air Quality

Fugitive dust is the major source of air pollution in the Eastern Kentucky Coal Field. Other sources of pollutants that affect air quality in the Coal Field are located in the industrialized sections of western Kentucky, West Virginia, Indiana, and Ohio.

Two candidate Class I areas have been designated in the Coal Field on the basis of their pristine air quality. These are the Cumberland Gap National Park (Bell County) and the Beaver Creek National Wilderness Preservation Area (McCreary County). All other areas are Class II Areas, a designation which was originally applied to all areas of the nation, but now indicates areas affected by moderate industrial activity. A third class (III) with inferior ambient air quality has been established, but no such areas have been designated to date in the Eastern Kentucky Coal Field.

Ambient air quality is generally in compliance with National Ambient Air Quality Standards (NAAQS) for suspended particulates, sulfur dioxide, nitrogen dioxide, carbon monoxide, lead, and ozone. Those monitoring stations where NAAQS are not met for a particular standard are listed in Table 3.8-1. The most extensive air pollutant in eastern Kentucky is particulate matter. Hydrocarbon concentrations are not monitored in eastern Kentucky.

The major air pollutant emitted from coal mining and preparation activities that can be considered significant is fugitive dust emissions. Mining operations that contribute to the emission of fugitive dust includes drilling, blasting, overburden stripping, material loading and unloading, transportation of material by truck, removal of the coal from the seam, cleaning and preparation of the coal, and the storage of coal or overburden in piles where wind erosion occurs.

3.8.2 Noise

An accurate description of the environmental acoustic conditions of the Eastern Kentucky Coal Field is not possible because of the lack of rural noise level data. The noise levels of urbanized areas in the Coal Field, based on a sample of six communities, may be high enough to cause annoyance, stress, complaints, and difficulty in conversing or relaxing outdoors. The most prevalent source of environmental noise is transportation with industrial sources ranked close behind. Within rural areas of the Eastern Kentucky Coal Field, coal mining and preparation activities can be assumed to be one of the most common stationary sources of noise. The transportation of coal would create transient noise sources along haul roads. The impact of these noise sources will depend upon the proximity of sensitive receptors (residences, health care facilities, schools, public parks or churches) to the source.

Major noise producing equipment used in surface mining operations typically consist of draglines, front-end loaders, tractors, haul trucks, scrapers, backhoes, and water trucks. The operation of these pieces of equipment generally is spread out over a relatively large area with little cumulative effect. Underground mining operations have slightly different

Table 3.8-1. Monitoring points where NAAQS are not met for particular standards.

	STANDARDS	
Total Suspended Particulates (TSP)	Sulfur Dioxide (SO_2)	Carbon Monoxide (CO)
Areas which do not meet primary or secondary standards:	Areas which do not meet primary standards:	Designated Non-Attainment Areas:
Bell County	Boyd County	Boyd County
Boyd County		
Louisa (Lawrence County)	Areas which do not meet Primary or secondary standards:	
Hazard (Perry County)		
Pikeville (Pike County)	Greenup	
Corbin (Whitley County)		

noise characteristics than surface mines. Major noise sources consist of the mine vent fan, front-end loaders, haul trucks, and water trucks.

Another source of noise associated with mining operations is haul roads. Unlike the noise from the mining operation which is assumed to radiate from the center, the noise from haul roads is assumed to travel outward parallel to the road. In addition to haul roads, many mining operations are also served by rail. Although noise from railroad operations is generally not as frequent as the other types of noise, the events can be considered very intrusive.

Coal preparation plants are also considered to be major sources of noise in the Eastern Kentucky Coal Field. Typically, the major noise producing machinery that occurs at preparation plants are crushers, conveyors, dryers, rock crushers, and sizing screens.

4.0 IMPACTS AND MITIGATION

The environmental, economic, and social impacts associated with New Source coal mining and related activities in the Eastern Kentucky Coal Field are described in this chapter. Impacts are described for the earth, water, biological, land, human, cultural, and air and noise resources. Appropriate measures that can be implemented to mitigate or lessen adverse impacts are also described.

4.1 EARTH RESOURCES

Coal mining activities in the Eastern Kentucky Coal Field can result in adverse impacts on certain elements of the earth resources of the area. The impacts of mining and mitigation techniques for earth resources predominately relate to steep slopes, unstable slopes, toxic overburden, and floodplains.

4.1.1 Impacts on Earth Resources

4.1.1.1 Steep or Unstable Slopes

The construction and operation of coal mines, haul roads, loadout facilities, and coal preparation plants can cause impacts on local earth resources. Mining or related activities that take place on steep or unstable slopes, slopes greater than 20°, or lesser slopes that are underlain by bedrock of low bearing strength or other poor geotechnical quality have a high probability of causing damaging landslides. Activities that take place on steep or unstable slopes that are located above residences, public facilities, or public roadways can endanger the public health and safety and become an adverse economic impact on the owners of such property if a landslide occurs. Any activity on slopes that involve the following activities may induce slope failure:

- removal of vegetation
- increased loading on a slope;
- undercutting the slope; or
- alteration of the hydrologic balance.

Coal mining activities commonly involve all of these operations.

4.1.1.2 Toxic Overburden

The chemical characteristics of overburden may also create adverse impacts. Toxic overburden is earth material situated above a coal seam that has the potential to produce adverse chemical and biological conditions in the soil, surface water, or groundwater if it is disturbed by mining. Surface water is affected by surface runoff from disturbed areas while groundwater is affected by the seepage of water through the toxic overburden and into an aquifer. Toxic overburden has a low pH and also may contain elements that are poisonous to plants and animals, acid-producing, or both. Excessive amounts of sodium salt, sulfur, copper, nickel and other trace elements in the water or the soil derived from mined overburden will have a detrimental effect on aquatic organisms or plants and may hinder revegetation. Arsenic, boron, and selenium are other elements that may be present in overburden. If they enter the food chain in low concentrations, these elements may be concentrated to toxic levels in the tissues of animals at higher levels of the food chain. Extremely acidic material or material with the potential of becoming acidic upon oxidation (pH 4.0 or less; chiefly the minerals pyrite and marcasite) have the capability to cause water pollution by chemical reactions resulting in increased acidity, low pH, and the presence of dissolved iron and other metals.

4.1.1.3 Floodplains

Mining activities can also create adverse impacts on floodplains in eastern Kentucky. Certain mining activities such as coal preparation plants and loadout facilities may encroach upon floodplains and cause modifications to the hydrologic capacity of the stream and result in the back-up of flood waters upstream. Also, sediment which runs off mined lands reduces the flood carrying capacity of streams. When the same magnitude flood must cover a larger area due to the reduction in water carrying capacity of a stream channel, negative economic and social impacts result from the damages caused by the higher flood waters. The costs of these impacts are born by the persons and businesses affected by the flood and by the region as a whole due to reduced productivity and increased payments under the National Flood Insurance Program.

4.1.2 Mitigation of Earth Resource Impacts

Adverse impacts to earth resources resulting from coal mining activities can be minimized by several potential mitigative measures. The application of these techniques will provide a consistent and meaningful level of protection to Kentucky's environmental resources. These mitigative measures include:

- the restriction of certain mining practices or operations on steep and unstable slopes;
- the use of neutralizers to combat acid formation in overburden, diversion of surface waters, and burial and reclamation of spoil to prevent the formation of toxic water pollution; and
- the prevention of mining activities in floodplains or the proper design of facilities that must occur in the floodplain.

4.1.2.1 Steep or Unstable Slopes

Where mining activities must take place on steep slopes mitigative measures can be taken to minimize the likelihood of slope failure. These mitigatible measures are in the form of restrictions on certain mining practices that can cause slope failure. Generally, the placement of spoil, waste materials, debris, and abandoned or disabled equipment on the downslope should be prohibited. Unlined or unprotected drainage channels should not be constructed on backfill areas. Prompt reclamation [illegible]ed areas, the elimination of highwalls, and the return of the mined area to original contours will also minimize the potential for damaging landslides.

If mining is to take place in an area where geotechnical problems may be encountered, such as constructing haul roads or structures on formations subject to sliding, sensitive receptors may be protected by relocating haul routes or structures to avoid such strata or to avoid sensitive receptors. Where relocation is not possible, careful design and construction of facilities can relieve or reduce possible impacts. Proper engineering and design is important in mitigating potential geotechnical related impacts.

4.1.2.2 Toxic Overburden

The adverse impacts caused by mining in areas where toxic or acid-forming overburden occur can be minimized by neutralizing the acid-forming potential of the disturbed overburden, isolation of the disturbed overburden, and by controls to prevent or reduce the rate of pollution formation. Neutralization is accomplished by thoroughly mixing the overburden with alkaline material. The alkaline material may occur naturally as on-site strata or it may have to be transported to the mining site. Isolation of toxic or acid-forming overburden can be accomplished by burying the overburden as deep as possible and then covering it with at least four feet of soil before reclamation of surface area. Certain controls or practices can be implemented to prevent or reduce the rate of pollution formation from toxic overburden. These controls include the diversion of surface runoff away from areas where overburden has been disturbed, the construction of impoundments to detain runoff from disturbed areas for treatment, and prompt reclamation and revegetation of the disturbed area.

4.1.2.3 Floodplains

The impact of mining activities on floodplains is best mitigated by the prevention of the encroachment of mining facilities into the floodplain. If facilities must be located in the floodplain, they should be designed to inhibit floodwater flow to the least extent possible so as to minimize flood damage upstream. The facility should be located as close to the edge of the delineated floodplain as practical. Affected structures upstream from the proposed facility may be relocated at the applicant's expense to locations not affected by floodwater back-up. Affected structures could also be purchased by the applicant and removed.

4.2 WATER RESOURCES

Historically, the mining of coal from surface and underground mines in the Eastern Kentucky Coal Field has resulted in the degradation of the surface water and groundwater resources of the Coal Field. Generally, mining activities can impact water resources by degrading the quality of the water and by reducing the quantity of water available for use.

4.2.1 Surface Water Impacts

The quantity and quality of surface water resources can be adversely affected by coal mining activities. Surface mining and the surface portion of underground mining affect the hydrologic characteristics of an area by reducing peak flood flows and by increasing base flows. The land disturbances associated with mining activities result in the on-site ponding of rain water which would otherwise run naturally into streams. This ponding results in reduced flood peaks and somewhat reduced flood volumes. The slow infiltration of water into the ground from the on-site ponds and subsequent movement of groundwater into the streams increases base flows in the streams during dry weather.

The quality of surface water is affected by mining activities through the introduction of high iron and manganese concentrations, acid mine water, and high sediment loads and concentrations. The erosion of exposed soil, coal refuse piles, and coal storage piles and overflow from sedimentation ponds during storm events results in the release and transport of sediment, toxic substances, and other water quality reducing elements to streams. The increased sediment loads, toxic wastes, acid mine drainage, and high dissolved solids contribute to a significant reduction in stream water quality which causes a reduction, alteration in composition, or elimination of aquatic life; an alteration, reduction, or elimination in water use opportunities for industrial processes and domestic consumption; and/or a decrease in the water-carrying capacity of downstream channels and/or floodplains. These water quality impacts are particularly significant when sensitive aquatic resources are located downstream. These sensitive aquatic resources include streams that are designated or proposed for designation for domestic water supply use, coldwater aquatic habitat use, Outstanding Resource Water of the Commonwealth, or identified as a Sensitive Aquatic Ecosystem by KNPC. Streams likely to be inhabited by a federally listed or proposed species in danger of extinction or threatened with endangerment as identified by KNPC are also included.

4.2.2 Groundwater Impacts

The major impact of coal mining upon the groundwater resources of the Eastern Kentucky Coal Field is the migration of acid mine drainage into the groundwater. Several mining practices affect the formation of acid mine drainage and its migration into the groundwater. Abandoned deep mines are the major source of acid mine drainage contamination in the region. These mines lie below the water table and provide for the free access of air to the shale and coal seams which contain the iron disulfide minerals. Since water, air, and the iron disulfide minerals are available, the formation of acid mine drainage results. Deep mines in which water is unable to freely discharge to the land surface require dewatering during their active life to allow work below the water table. Dewatering lowers water levels and can result in the oxidation of exposed iron disulfides. When deep mines are abandoned and dewatering is discontinued, portions of the depleted aquifer may be replenished with acid mine water as the mine refills with water. For this reason, abandoned mines may be a greater source of groundwater contamination than are operating mines (USEPA 1980). If the rate of groundwater recharge from an abandoned underground mine is slower than the rate of seepage into the mine, the openings become flooded and oxidation may stop.

Surface mines which have not been reclaimed or are presently in operation can produce acid mine drainage by several means. Contour surface mining frequently incorporates the mining of a highwall from a level bench and disposal of overburden downslope of the bench. The disposal of overburden downslope is not always complete and may result in the formation of a mound of overburden on the edge of the bench. The area between the mound and the highwall provides an area for the formation of pools of acid mine water. The pools can then migrate via fractures into the groundwater aquifer and contaminate it.

The overburden from strip mine operations and shales from cleaning operations in deep mines commonly contain relatively large concentrations of iron disulfides. When disposed in waste piles or used as fill for roads, the overburden and shale can serve as an acid mine drainage contamination source for groundwater.

Auger mining consists of horizontally augering the coal seam along a highwall. Exposed auger holes are direct sources of mine drainage emission and can cause subsurface water pollution through surface water inflow (USEPA 1975) and consequent infiltration. Exploratory drillholes that have not been properly backfilled are also avenues for the flow of surface pollutants and acid mine drainage into aquifers.

Sedimentation ponds are used for the settling out of fine particle matter contained in slurry from coal cleaning operations. The fine particle matter is capable of producing acid mine drainage since it consists of shale and coal which contain the iron disulfide minerals. These ponds, commonly constructed without impermeable liners, can be sources of groundwater contamination. When constructed without impermeable barriers they allow the migration of impounded water into the subsurface to occur.

Conditions which will have the greatest effect on groundwater quality due to degradation by acid mine drainage exist where a mine or other point source of acid mine drainage serves as a recharge area. Recharging of an aquifer with acid mine drainage will contaminate it. However, sources of acid mine drainage present in aquifer discharge areas will not affect the quality of the groundwater.

4.2.3 Mitigation of Surface Water Impacts

The adverse impacts of coal mining activities on surface water quality can be minimized by a variety of mitigative measures. These mitigative measures include:

- at source controls to prevent or reduce the rate of pollution formation;
- treatment of polluted water before discharge;
- techniques for dispersing and diluting released polluted waters;
- techniques for isolating polluted water; and
- requirements for more intensive water quantity and quality monitoring signal the need for additional control efforts.

At source controls reduce or prevent the rate of pollution formation and include surface land reclamation, drainage diversions, impoundments, refuse pile reclamation, and revegetation. Land surface reclamation activities include prompt backfilling, grading, and revegetation of ground disturbed by excavation. To minimize erosion problems during reclamation, construction of water diversion ditches may be required. Drainage diversions are designed to channel surface waters or mine waters to control volume, direction, and retention time. Impoundments are designed to restrict waters within an isolated area of a surface mine. These waters may be treated and released or disposed of in some other way. Waste rock and other refuse may be reclaimed by burying or covering and by then revegetating the area. Revegetation is usually the final step in land rehabilitation and involves planting and maintaining grasses, legumes, and/or trees on the surface areas disturbed or altered by excavation or dumping.

Several approaches may be utilized for treating polluted waters. First, all sources of surface flow and runoff should be diverted to identifiable points of treatment and discharge. At these points or along drainage channels, the polluting effects of acid mine drainage can be chemically counteracted by neutralizing the acid with lime, sodium hydroxide, or hydrous ammonium. Other treatment methods are available, however high costs make them unsuitable for mining effluent.

In lieu of or in addition to treating polluted waters before release, volumes, rates, times, and locations of the releases may be planned so as to enhance dispersion or dilution of the pollutants. If the regulations developed for Underground Injection Control (UIC) can be met, polluted waters may be isolated by injection into deep wells.

4.2.4 Mitigation of Groundwater Impacts

Acid mine drainage is the principal source of groundwater pollution in the Eastern Kentucky Coal Field. Measures to prevent groundwater pollution from acid mine drainage include:

- prevent the formation of acid mine water in underground mines by using mine seals or well dewatering;
- isolation and/or neutralization of spoil from mines; and
- treatment of acid mine water before discharge into streams or wells.

Abandoned deep mines are the worst single source of acid mine drainage affecting groundwater. There are two methods of controlling acid mine drainage from within the mine, mine seals and well dewatering. There are two types of sealing methods, dry seals and hydraulic seals. Dry seals prevent the free passage of air and water into the mine. This type of seal is used only where there is a slight possibility of hydraulic head forming behind the seal. Hydraulic mine seals are placed at a point of gravity discharge. The seals then dam up water behind them and flood the mine workings, keeping out oxygen and preventing or reducing the formation of acid mine water. Hydraulic seals should be controlled with overflow mechanisms in the event that the seal fails as a result of too large a total head of water developing behind the seal.

The second type of mine drainage control from within a mine is through well dewatering. Unlike seals, mine dewatering via wells is possible while mining operations are in progress. Mine dewatering is the method by which water flow into the mine is curtailed and contamination prevented by developing well schemes to control water flow and contact with acid producing formations.

Spoil piles from underground workings and from surface mines are also sources of acid mine drainage. The formation of acid mine drainage can be reduced by surface restoration of these spoil piles. Surface restoration reduces formation of acid mine drainage by promoting: (1) rapid runoff, thereby decreasing infiltration; (2) vegetative consumption (transpiration); (3) near surface moisture retention with eventual evaporation; and (4) reduction of oxygen contact with acid forming minerals. Spoil pile neutralization will also prevent the formation of acid mine drainage. Spoil pile neutralization is the treatment of spoil piles with neutralizing agents. This is accomplished by injecting a neutralizing slurry containing pulverized limestone and/or hydrated lime into the spoils through grout sleeves.

Treatment of acid mine drainage water is usually undertaken only after all other preventative measures have been carried out to the fullest extent. This is because acid mine water treatment has the greatest long term cost. High long term costs are encountered due to labor and material expenditures. Neutralization is the most cost effective treatment method. Neutralization techniques are developed around mixing a chemically basic substance with acid mine drainage to neutralize acid and precipitate salts. Lime, limestone, or a combination of both have been extensively used for neutralization. An analysis of topography, geology, and availability of materials must be carried out to determine the nature of the treatment plan to be used.

4.3 BIOLOGICAL RESOURCES

The construction and operation of coal mines, haul roads, and preparation plants can cause severe impacts on the biological resources of the Eastern Kentucky Coal Field. These impacts include loss or disturbance of terrestrial habitats, aquatic habitats, wetlands, and sensitive species. Direct effects may include elimination of terrestrial vegetation and wildlife habitats on mine sites (especially significant for strip mines) and elimination of aquatic life in receiving streams due to stream removal, increased sedimentation, or changes in water chemistry. Mining activities may also cause direct effects by producing changes in the hydrologic regime in the receiving streams.

4.3.1 Biological Impacts

Many of the terrestrial ecosystems in eastern Kentucky have been greatly affected by man's activities in the past. These activities have included logging, mining, farming, and urban expansion. The major issues with respect to terrestrial ecosystems in the Eastern Kentucky Coal Field are: (1) elimination or disturbances of terrestrial habitat by mining activities; (2) potential effects of mining on identified sensitive natural areas; and (3) the ability to successfully reclaim mined areas including orphan mines. Terrestrial habitats in the Coal Field may be affected by both underground and surface mining operations. Underground mining may result in the direct elimination or disturbance of terrestrial vegetation at the mine mouth and along haul roads. This affects both plant and animal communities. Underground mining can also cause subsidence or changes in groundwater levels which may alter growth patterns and species composition of terrestrial vegetation. Surface mining may affect terrestrial communties by direct removal of vegetation or by alteration of the substrate. Coal removal alone is seldom the most important impact of surface mining, however, unless rare or endangered species are eliminated. More significant disturbances result from soil modification caused by overburden removal. Potential impacts may include changes in drainage patterns, disruption of soil organisms responsible for nutrient recycling, changes in soil structure and soil composition which in turn affects nutrients and moisture availability, and changes in soil chemistry. Therefore, the primary concern for the protection of biological resources in the Eastern Kentucky Coal Field is the ability to effectively reclaim mined areas.

Reclamation of orphan mine lands in the Eastern Kentucky Coal Field is also a major issue since these areas represent degraded ecosystems which reduce overall habitat value and also contribute significantly to degradation of aquatic habitats. Even if reclamation efforts are successful, however, the reclamation process itself may have adverse impacts on area aquatic systems due to increased runoff of fertilizers, lime, or pesticides which may be used to manage revegetated areas. Such materials may cause eutrophication or produce toxic effects in aquatic systems if reclamation is done improperly.

The major issues with respect to the possible effects of mining on aquatic habitats in the Eastern Kentucky Coal Field are: (1) direct elimination of wetlands, streams segments, and associated impacts; (2) disturbance of receiving streams, rivers, and wetlands by increased acid-mine drainage and sedimentation in an area already significantly affected by previous mining activities; (3) potential impacts on remaining sensitive aquatic and wetland habitats; and (4) effectiveness of reclamation efforts in reducing or minimizing impacts on aquatic and wetland habitats.

Surface mining activities in particular may result in the direct removal of stream segments and wetlands. Although streams may be replaced by grading to original contour following mining activities, several years or more may be required for full recovery (Herricks and Cairns 1974). Both streams and wetlands may also be significantly affected by acid runoff, fertilizers, lime, and sedimentation from the mined areas during reclamation activities. Direct removal of stream segments during mining may cause changes in groundwater levels that result in downstream changes in flow rates, frequency and duration of flooding, and increases in erosion and sedimentation rates (Darnell 1976; Haynes et al. 1979). This also may result in elimination of benthic organisms, fish, and microscopic plant life. Replacement of stream segments by sediment ponds also reduces the quality of aquatic life since such ponds are typically characterized by reduced water quality (e.g., higher levels of sulfates, acids, metals; Haynes et al. 1979). Wetlands may also be affected by changes in the hydrologic balance (Darnell 1976). Potential impacts primarily include changes in groundwater inflow and soil moisture levels, both of which may result in direct impacts on wetland vegetation or changes in species composition.

Aquatic habitats and wetlands may already be significantly affected by acid mine drainage and sedimentation caused by post-mining activities. Sedimentation generally has the more significant potential impact on aquatic life due to increased erosion from mined areas and coal washing facilities (Haynes et al. 1979). Sedimentation may cause increased scouring in streams, shading of benthic plants, direct smothering of benthic invertebrates, or creation of unstable substrates unsuitable for animal colonization (Hart and Fuller 1974). The loss of benthic plants and animals typically results in elimination of fish from affected areas (Haynes 1970). Sedimentation may also directly affect fish by clogging gills, causing osmotic stress, smothering eggs deposited in the substrate, reducing disease resistance, or changing migratory patterns (Dvorak et al. 1977). High BOD loadings may also be associated with increased sedimentation which can have direct effects on aquatic biota or increased availability of toxic compounds.

Acid mine drainage may cause additional stress on the aquatic life of receiving streams. Acid drainage usually is characterized by high TDS levels (primarily SO_4), high levels of heavy metals, and high hardness. Biological impacts are highly variable and site-specific (Roback and Richardson 1969). Acid drainage may lower the pH of receiving waters, thereby increasing the release of sulfur by iron and sulfur bacteria (Dugan 1972); reducing growth of benthic algae; eliminating fish life by direct and indirect mechanisms; and increasing the availability of heavy metals (Haynes et al. 1979). Altered TDS levels may cause osmotic stress in aquatic organisms or alter the toxicity of metals (National Academy of Science, National Academy of Engineering 1973). Benthic substrates can also be covered by ferric hydroxide precipitates (yellowing) which smothers benthic life and obstructs fish gills.

Mining activities in eastern Kentucky have a great potential to produce impacts on threatened or endangered species, species of special concern, and species of undetermined status. As of 1979 there were 111 animal and 97 plant species with these classifications in the Eastern Kentucky Coal Field. Of these, seven endangered animals, two endangered plants, and 13 threatened plants are Federally listed. Surface mining in the Eastern Kentucky Coal Field has a great potential to produce impacts on these sensitive terrestrial species due to the relatively large amount of land disturbed by this type of mining. Impacts on sensitive plants are typically a result of direct elimination during land clearing operations. Site-specific surveys are usually necessary to assure protection of sensitive plants. Impacts on sensitive animals are usually an indirect result of habitat destruction.

4.3.2 Mitigation of Biological Impacts

The mitigation of mining-related impacts on the terrestrial and aquatic biological resources of the Eastern Kentucky Coal Field can be accomplished by:

- the avoidance of mining in sensitive resource areas;
- the protection of water quality in receiving streams;
- prompt reclamation of disturbed land;
- the replacement of lost resources with resources of comparable value;
- the establishment of buffer zones around sensitive biologic resource areas; and
- changes in the rate or scheduling of mining activities to minimize adverse impacts to biological communities.

Water pollution mitigation measures have been described previously in Section 4.2. Reclamation is one of the key mitigative measures to be used to reduce the long-term impacts of mining on biological resources in the Coal Field.

The re-establishment of vegetation on denuded areas is a key measure in reducing erosion and runoff impacts. According to Plass (1975), birch and Eleagnus species were successful on mine spoils as well as silk tree, tree of heaven, French tamerisk, Japanese fleeceflower, and amur private. Black locust and evergreens are successful (Garner 1953) and often used in reclamation practices. Vimmerstedt (1970) found that European alder could be used to replace black locust as a nitrogen fixing tree.

Vogel and Berg (1968) stated that the relative success of plants on mine spoils is determined by pH. Eragrostis curvula is successful on acid spoils. Plant cover can protect spoil surfaces until trees are established. According to Ruffner (1962), crown vetch is good on less acid spoil slopes, sweet clover is good for erosion control, narrow leaf trefoil is the best legume for dry shallow shale spoils, tall oat grass is good in moderate acid spoils, exotic bluestems are successful during midsummer drought, and switch grass is good in steep areas or in stoney high limey spoils. Hill (1973) found that weeping lovegrass and European alder were successful on mine spoils. Vegetation should be chosen not only for its ability to survive on the reclaimed land but for its ability to support wildlife.

Fertilization, liming, and mulching are important processes for reconditioning the soil. Fertilization is necessary to replace nutrients lost through stripping topsoil and erosion. The application of flyash, composed wastes, processed sewage, and bark is being used to aid in soil improvement in disturbed areas. Municipal wastewater aids in revegetation and that sewage is a good pH neutralizer.

Liming is usually necessary preliminary to planting. Liming is applied to raise pH, thus making soil more alkaline. Liming, therefore, improves the success of vegetation.

Hydraulic seeding on slopes has been found to be very advantageous (Rogers 1971), while broadcast seeding with no bed preparation is not very successful. Green and Hansen (1969) found that heavier seeds exhibit a higher percent of germination as compared to light seeds. Mulching and seeding should be achieved at the earliest possible time after an area has been mined.

Another means of developing mitigative measures is through a preliminary environmental study such as those conducted for OSM's Small Operators Assistance Program (SOAP). Various hydrological, geological, and biological data are obtained and analyzed which can aid in determining possible impacts produced by mining activities. Specific mitigative measures can then be applied to reduce the severity of the identified impacts.

In some cases, the adverse impacts of mining on biological resources can be mitigated by the replacement of lost resources with resources of an equal value. An example of this type of mitigative measure would be the restocking of animal species after mining or the replacement of one type or area of wildlife habitat with another.

Where particularly sensitive or unique biological habitats occur, mining activities may have to be prohibited in order to preclude serious impacts. A buffer zone around the sensitive area might also be required to protect the sensitive species from the noise, dust, erosion, and other associated impacts caused by mining.

4.4 LAND RESOURCES

The continued extraction of coal resources from the Eastern Kentucky Coal Field will create adverse impacts on the land resources of the Coal Field. Two major impacts will occur as a result of coal resource extraction and the associated activities: (1) the conversion of Environmentally Significant Agricultural (ESA) land (as defined in 3.5.2.) to non-farming use; and (2) the conversion of recreational land resources to other uses and the degradation of the environment adjacent to the recreational facility.

4.4.1 Impacts on Environmentally Significant Agricultural Lands

The cumulative effect of continued coal production and increasing population levels in the Eastern Kentucky Coal Field will result in the conversion of ESA land to urban and mining-related uses. The conversion of ESA land in the Eastern Kentucky Coal Field is considered a significant adverse impact because of the relative scarcity and high economic value of this land resource in the Coal Field. The further reduction of this farmland in eastern Kentucky would diminish the area's cropland base and diminish environmental quality by reducing the beneficial role which the land itself can play. Agricultural land reduces runoff by absorbing precipitation, aids in replenishing groundwater supplies, buffers environmentally sensitive areas from encroaching development, and can serve in wastewater treatment through land treatment processes. Other benefits of retaining agricultural land in or near urbanizing areas are the value of convenient sources of food production in proximity to consumer markets enabling reduced consumption of scarce fossil fuels for transportation, which in turn will assist in protecting ambient air quality, and the open space; recreational, and aesthetic setting these lands may provide for fuller enjoyment of cleaned waters.

Reclaimed surface mining areas can be used to create additional agricultural land. The quality of these reclaimed lands for agricultural production may vary however.

Preparation plants are located necessarily in the flat valleys of eastern Kentucky in proximity to the transportation networks. These flat valley floors are also the location of most prime agricultural lands in the Coal Field. In addition to the plant facilities themselves, disposal of sludge from plants creates the potential for significant adverse impacts on agricultural lands. Where sludge is deposited covering prime agricultural soils the soils cannot be reclaimed.

4.4.2 Impacts on Recreational Resources

The recreational land resources of the Eastern Kentucky Coal Field include National, State, and local public parks; National Wildlife Refuges and Wilderness Areas; National System of Trails; State wildlife management areas; and State or National Wild, Scenic or Recreational Rivers including rivers that are under study for such designation. These recreational lands are important regional resources that require protection from the direct and indirect effects of mining activities in order to preserve future recreational opportunities for the region's population.

Mining activities can adversely impact recreation land through the direct conversion to mining or other land uses as well as by the indirect effect of pollutants produced by the mining activities on nearby recreational facilities. These pollutants include noise and dust emissions as well as the degradation of the aesthetic value of the recreation land. Noise and dust emissions from nearby mining activities including mines, preparation plants, and haul roads can interrupt recreational activities and reduce the recreational value of the land. Wildlife habitats that are part of the recreation area can be similarly impacted, reducing the value of the land for nature observation, conservation, and education activities. Mining, particularly surface mining, that occurs near recreational land can reduce the aesthetic quality of the viewshed for persons utilizing the recreation land. Even after the mined area is restored and revegetated the aesthetic quality of the viewshed may never equal pre-mining levels. The recreational value of areas from which the mining activity can be viewed is thereby reduced.

4.4.3 Mitigation of ESA Land Impacts

Coal mining activities, especially surface mining, on Environmentally Significant Agricultural lands can permanently destroy the productive potential of the natural soil. Where mining activities take place on these lands, mitigative measures should include the consideration of underground mining methods where surface mining would disturb large areas of prime farmland. Where underground mining methods cannot be utilized, surface mining and reclamation operations' impacts on agricultural land can be minimized by utilizing the following soil removal, stockpiling, and replacement procedures:

1. Topsoil materials to be used in the reconstruction of the farmland topsoil should be removed before drilling, blasting, or mining, in accordance with Section 2 below, and in a manner that prevents mixing or contaminating these materials with undesirable material. Where removal of soil materials could result in erosion that may cause air and/or water pollution, appropriate methods to control erosion of exposed overburden should be used.

2. Soil Removal

   (a) Surface coal mining and reclamation operations on prime farmland should be conducted to:

      (1) Separately remove the entire A horizon or other suitable soil materials which will create a final soil having an equal or greater productive capacity than that which existed prior to mining.

      (2) Separately remove the B horizon of the soil, a combination of B horizon and underlying C horizon, or other suitable soil material that will create a reconstructed soil of equal or greater productive capacity than that which existed before mining.

      (3) Separately remove the underlying C horizons, other strata, or a combination of horizons or other strata, to be used instead of the B horizon. When replaced, these combinations should be equal to, or more favorable for agricultural products than the B horizon.

   (b) The minimum depth of soil and soil material to be removed for use in reconstruction of farmland soils should be sufficient to meet the soil replacements of Section 4(a).

3. Soil Stockpiling

   If not utilized immediately, the A horizon or other suitable soil materials specified in Section 2(a)(1) and the B horizon or other suitable soil materials specified in Sections 2(a)(2) and 2(a)(3) should be stored separately from each other and from spoil material. These stockpiles should be placed within the permit area where they are not disturbed or exposed to excessive water or wind erosion before the stockpiled horizons can be redistributed.

4. Soil Replacement

Surface coal mining and reclamation operations on farmland should be conducted according to the following:

(a) The minimum depth of soil and soil material to be reconstructed for farmland should be 48 inches, or to a depth equal to the depth of a subsurface horizon in the natural soil that inhibits root penetration, whichever is shallower. A depth greater than 48 inches may be appropriate wherever necessary to restore productive capacity due to uniquely favorable soil horizons at greater depths. Soil horizons shall be considered as inhibiting root penetration if their densities restrict or prevent penetration by roots of plants common to the vicinity of the permit area and have little or no beneficial effect on soil productive capacity.

(b) Replace soil material only on land which has been first returned to final grade and scarified unless site specific evidence is provided showing that scarification will not enhance the capability of reconstructed soil to achieve equivalent or higher levels of yield.

(c) Replace the soil horizons or other suitable soil material in a manner that avoids excessive compaction. Compaction shall be considered excessive if, on more than 10 percent of the replacement area, any layer of reconstructed soil has a moist bulk density of 0.1 gram per cubic centimeter more than the values for the equivalent layer of the undisturbed soil.

(d) Replace the B horizon or other suitable material specified in Sections (a)(2) and (a)(3) to the thickness needed to meet the requirements or paragraph (a) of this section.

Whenever there is opportunity to create soil conditions more favorable than occurring in the natural state, every consideration should be given to promoting these conditions.

4.4.4 Mitigation of Recreational Land Impacts

The adverse impacts resulting from coal mining activities located adjacent or near to recreational land can be mitigated or minimized through various actions and methods. These include:

- Reduction or redefinition of surface mined areas to boundaries where impacts on recreation land are eliminated or reduced.
- Selection of haul routes that will avoid recreation areas.
- Construction of barriers or use of natural topographic features as barriers to reduce or eliminate noise and visual impacts.
- Consideration of underground mining methods where surface mining is responsible for significant impacts.
- Relocation of surface facilities of underground mines where those facilities create major impacts.
- Stage mining and mining related activities to minimize adverse impacts.

4.5 HUMAN RESOURCES

Coal mining and associated activities in the Eastern Kentucky Coal Field will have both beneficial and adverse impacts on human resources and transportation. These impacts occur in the form of economic effects, rapid population growth, increased demand in public and private services, and transportation impacts.

4.5.1 Impacts on Human Resources

In general, the economic effects of coal resource development in eastern Kentucky would be considered beneficial to the economic well-being of the region. Changes will occur in the economic base of the Coal Field as well as in the economic status of the residents. As coal mining becomes more extensive and provides more employment opportunities, the economic base of the Eastern Kentucky Coal Field will become further oriented towards coal mining.

A heavy reliance on coal mining however, has many inherent risks, thus endangering the economic and social well-being of residents of eastern Kentucky. This heavy reliance may lead to unforeseen fluctuations in employment, particularly should a situation of decreasing demand for coal occur. The heavy out-migration of eastern Kentucky residents during the 1960's would have been far less severe had the economy exhibited greater diversification.

The most significant adverse effects of coal resource development on human resources are caused by rapid population growth. Rapid population growth occurs in response to the sudden creation of jobs in an area that does not have a local labor force of sufficient size and/or skill to fill the available positions. When this happens non-local workers and their families are attracted to the area because of the employment opportunities made available to them. These new residents require adequate levels of basic community services and facilities (infrastructure) such as housing, wastewater treatment, water, health care, education, transportation network, fire and police protection, and recreational facilities. In most instances, the existing tax base of the community cannot supply these services and facilities to the new residents on such a short notice. Because of the lag in the receipt of tax revenues from the new residents and the long lead times and high costs of required public improvement projects, serious strains on existing infrastructure elements occur.

The availability of adequate housing is often one of the most serious problems that results from rapid population growth. The provision of housing for the new residents of an area may lag several years behind the need because of the lack of adequate public infrastructure (roads, sewers, water, etc.), the unavailability of construction and/or mortgage credit, or the inability to assemble land needed for new housing developments. As a result, the cost of existing housing as well as any new units built increases beyond the financial capability of most of the population. Many people are forced to live in mobile homes in rural areas that are not provided adequate services or must commute long distances to work from areas where housing is available.

The rapid population growth experienced in eastern Kentucky during the 1970's has intensified many problems that have long plagued the area. The combined effects of severe housing shortages, high construction costs, and a lack of developable land have created problems for many local residents, especially those with low and moderate incomes. Malfunctioning water and wastewater systems are strained even further by the population influx (NACO 1979).

Local transportation networks, primarily the road system, can also be adversely affected by mining activities and mining-induced population growth. Public safety problems on local roads can occur as a result of the larger volumes of private vehicles using the roadways, the larger number of commercial vehicles (primarily coal haul trucks) using public roadways, and increases in coal-related rail traffic which cause a higher probability of rail-highway crossing accidents and delays. The larger volumes of coal haul trucks using public roadways may also degrade the quality of the road surface and weaken bridges as well as create noise and dust emissions that disturb nearby sensitive receptors.

4.5.2 Mitigation of Human Resource Impacts

The mitigation of many of the impacts on human resources of the Eastern Kentucky Coal Field are difficult to accomplish because of the cumulative nature of the impacts. Although population growth resulting from the opening of one coal mine may not be considered significant, the cumulative impact of the opening of several mines in an area may be serious enough to severely impact local housing supply and services. This is a particularly critical factor to consider in the Eastern Kentucky Coal Field because of the relative scarcity of human services in the area. Funding assistance to local governments struggling with the impacts of rapid population growth is one method of mitigating impacts.

The adverse impacts of coal mining activities on the transportation network in the Eastern Kentucky Coal Field can be lessened or eliminated by employing a variety of mitigative measures. These measures include changes in operational procedures, routing, or mode of transport. The type of mitigative measure employed should be matched to the type of impact that occurs. Potential mitigative measures are as follows:

- Limitation of haul periods during the day to non-peak periods to reduce congestion during peak traffic periods.
- Develop alternative haul routes to be used to relieve primary haul routes during peak traffic volume periods if congestion or public safety hazards develop.
- Consideration of alternative hauling methods (e.g., rail, conveyor, barge, or pipeline) if other mitigative methods are not able to lessen impacts.
- Relocation of facilities such as preparation plants or tipples to reduce local transportation impacts.

4.6. CULTURAL RESOURCES

Coal mining has the potential to alter or destroy archaeological and historic resources that occur at or near the mining site. Mitigative measures are available to minimize or avoid the adverse impacts of mining activities on cultural resources.

4.6.1. Impacts on Cultural Resources

Coal mining activities in the Eastern Kentucky Coal Field will result in primary and secondary impacts on the cultural resources of the area. These resources may include archaeological and historic sites, properties, structures, or objects that are listed on or determined eligible for the National Register of Historic Places. Primary impacts on cultural resources are those adverse effects that would result from construction or operation of coal mines or related facilities. Adverse effects are more common and may consist of one or more of the following (36 CFR 800 as amended):

- Destruction or alteration of all or part of a property;
- Isolation from or alteration of its surrounding environment;
- Introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting;

- Transfer or sale of Federally-owned property without adequate conditions or restrictions regarding preservation, maintenance, or use; and

- Neglect of a property resulting in its deterioration or destruction.

Historic and archaeological resources are highly susceptible to damage by the mining of coal, particularly by surface mining that entails an extensive modification of large surface areas. Mine pits, haul roads, and fills frequently encompass several landforms, all or any of which may contain archaeological sites.

The secondary impacts on cultural resources are those beneficial or adverse effects that may occur indirectly as a result of construction or operation of coal mines or related facilities. Secondary adverse impacts on archaeological and historic resource can include the indirect impacts that result from induced related growth such as subsidiary industrial development, development related to distribution and marketing of coal, or housing development.

Development related to coal mining or alteration of open space surrounding known historic structures and constituting an integral part of their historic setting potentially may diminish the historic integrity of such properties. Similarly, alteration of the character of designated or potential historic districts by the introduction of structures, objects, or land uses that are incompatible with the historic setting and buildings of the district constitutes an adverse impact on the historic quality of the the district. Occasionally, induced growth and industrialization increase pressures to demolish historic buildings in order to make way for new development.

Beneficial impacts of coal mining on archaeological resources may include road construction that provides greater access to the sites for scientific investigation and a possible increase in the site location data base if surveys are made during the permit application process. Enhancement of the positive aspects can be accomplished if archaeological sites adjacent to coal mine permit areas are formally registered with the SHPO. If unrestricted access is provided to looters and vandals, however, the potential benefits from the added roads can be negated.

4.6.2 Mitigation of Cultural Resource Impacts

Mitigative measures are developed on a case-by-case basis for each type of site or property. Standard forms of treatment include, but are not limited to the following:

- avoidance through rerouting locations of mining and construction activities;
- recording and relocation and/or recording and demolition of standing structures (recording means photographs, measured drawings, and documentation according to National Architectural and Engineering Record [NAER] standards);
- in-place preservation of archaeological properties through the use of protective burial, barriers, or buffers and designing structures over an archaeological site in such a way as to minimize subsurface disturbances;
- archaeological monitoring during construction of facilities; and
- data recovery/excavation of the archaeological site conducted under a scope of work in consultation with the SHPO, the Advisory Council, and USEPA.

Identification of cultural resources is the first step toward the mitigation of mining impacts. In order to identify all historic structures, properties, and places that may be eligible for the National Register of Historic Places and that may be affected adversely by coal mines or related facilities, a mechanism is needed to ensure that significant resources will be identified prior to issuance of New Source permits. The State Historic Preservation Officer is the mandated administrator of the National Historic Preservation Act of 1966 as amended in the Commonwealth of Kentucky. As such, the SHPO maintains responsibility for National Register and National Register eligible sites as well as substantial file data not made available for USEPA use. The SHPO is familiar with the amount of survey work previously conducted in the vicinity of each potential mine site or coal preparation site in Kentucky for which a permit is sought. Should there be insufficient available information regarding historic resources of the area, the SHPO may recommend that a historic resources survey be conducted by the applicant. The SHPO also is authorized under the US Advisory Council Procedures for the Protection of Historic and Cultural Properties (36 CFR 800 as amended) to delineate the area of impact of any New Source coal mine.

If significant resources are identified that will be affected by coal mining operations, several options are available as mitigation. The SHPO, the appropriate USEPA officials, and the Executive Director of the US Advisory Council on Historic Preservation are required under US Advisory Council Procedures (36 CFR 800) to confer and decide upon appropriate mitigative measures on a case-by-case basis. Such mitigation can range from permit conditions that require the avoidance of disturbance to the historic structure (if demolition is indicated) to planting of trees and shrubs to screen the mining activities from the historic property in order to retain its historic setting. When mitigation measures have been agreed upon, a Memorandum of Agreement concerning the necessary NPDES permit conditions will be executed formally. If mitigation either cannot be identified or if the applicant will not accede to the permit conditions required, the New Source permit cannot be issued by USEPA without the preparation of an EIS.

The procedures for assessing the potential impacts on archaeological resources is similar to that used for historic structures and properties. The SHPO may recommend special permit conditions to protect significant archaeological resources and/or recommend on-the-ground surveys to identify unknown archaeological resources, as appropriate. If archaeological resources that may be eligible for the National Register of Historic Places are identified during surveys, nomination forms should be submitted by the USEPA or the applicant to the SHPO. Resources considered eligible by the SHPO then are forwarded by him to the US Secretary of the Interior for a determination of eligibility. If eligible, mitigative measures probably will be necessary where such resources potentially would be affected by proposed mining operations. USEPA officials, the US Advisory Council, and the SHPO are required to confer and develop appropriate mitigative measures on a case-by-case basis. If mitigation either cannot be identified or if the applicant will not agree to the permit conditions required, the New Source permit cannot be issued by USEPA.

4.7 AIR QUALITY AND NOISE

4.7.1 Impacts on Air Quality

Coal mining and associated activities in the Eastern Kentucky Coal Field may result in significant amounts of fugitive dust emissions. Other pollutants may be emitted into the air as a result of these operations, but in insignificant amounts. Fugitive dust emissions are generated primarily due to truck traffic on unpaved public or private haul roads. Other sources include surface mining, blasting, preparation, coal loading and unloading, and wind erosion. The transportation of coal by truck on unpaved haul roads is the major contributor of fugitive dust emissions from coal-related activities in eastern Kentucky.

The close proximity of many residential sites to haul roads exacerbates the problem of fugitive dust emissions in the Eastern Kentucky Coal Field. Many haul roads in the Coal Field are unpaved and therefore are a major source of fugitive dust. In addition, residences and other sensitive receptors are generally located much closer to haul road routes than to actual mining or preparation areas. For these reasons the fugitive dust emissions along the coal truck haul routes, particularly unpaved routes, can result in significant adverse environmental impacts. Initial investigations have determined that there is potential for significant violations of primary ambient air quality standards at sensitive receptors along unpaved haul roads. These sensitive receptors include any place where humans live, work, or otherwise congregate.

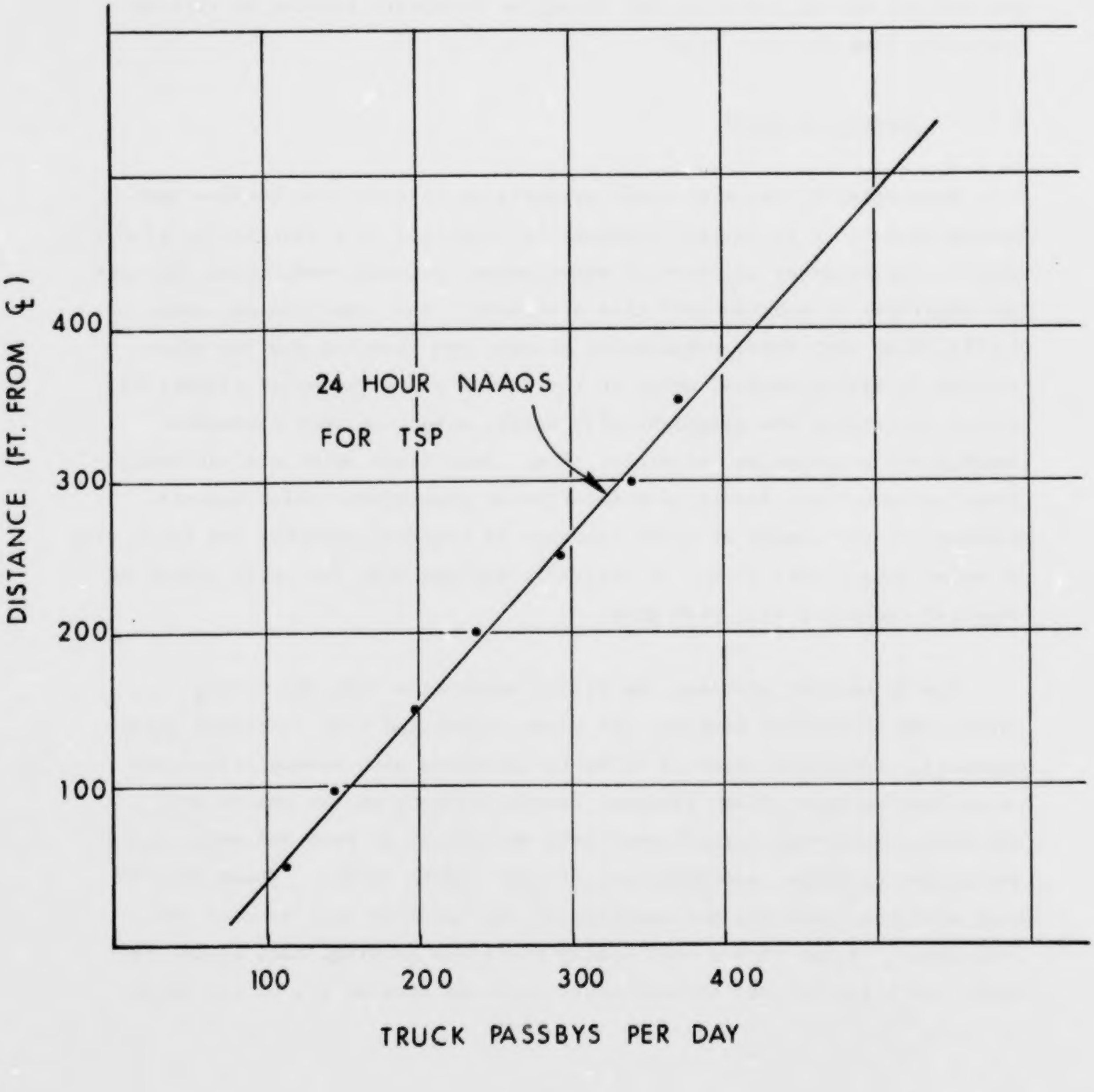
An analysis was performed to determine the impact to sensitive receptors along unpaved roads due to haul truck traffic. Emission factors for haul truck operations were developed and used with the HIWAY-2 air pollution computer model to determine ground level total suspended particulate (TSP) concentrations. This computer model generated emission data that was used to calculate the maximum daily number of haul truck passbys versus various distances of sensitive receptors from the centerline of the roadway which would result in concentrations equal to or greater than the NAAQS for TSP. This resulting data is indicated in the graph in Figure 4.7-1. This graph can be used to determine the maximum allowable number of haul truck passbys per mining operation for sensitive receptors located at various distances from the haul route.

4.7.2 Impacts on Noise

Historically, the mining and preparation of coal from surface and underground mines in eastern Kentucky has resulted in a degradation of the acoustic environment adjacent to these mines, although monitoring data are not available to substantiate this statement. Coal haul trucks, rock drills, mine vent fans, preparation plants, and blasting are the major sources of mining-related noise in the Coal Field. The noise effects of mining operations are geographically small, affecting only receptors immediately adjacent to the mining site. Only mines which are extremely close to each other result in cumulative or synergistic noise impacts. However, as the number of mines increase in eastern Kentucky, the total area of noise impact will grow. It logically follows that the total number of affected receptors will also grow.

The acoustical problems and issues associated with the mining activities in eastern Kentucky are those associated with increased noise exposure. Excessive noise is known to interfere with communication and cause hearing loss, heart disease, harmful effects on the unborn and children, annoyance, interference with activities at home and work, mental and social problems, and even loss of life (USEPA 1978b). These effects vary with the intensity and duration of the noise as well as with the individual. Noise from a coal mining operation (mining, haul roads, rail line, and blasting) may be sufficient to cause some or all of the above

Figure 4.7-1. The 24-hour NAAQS for TSP as a function of haul truck passbys and distance.



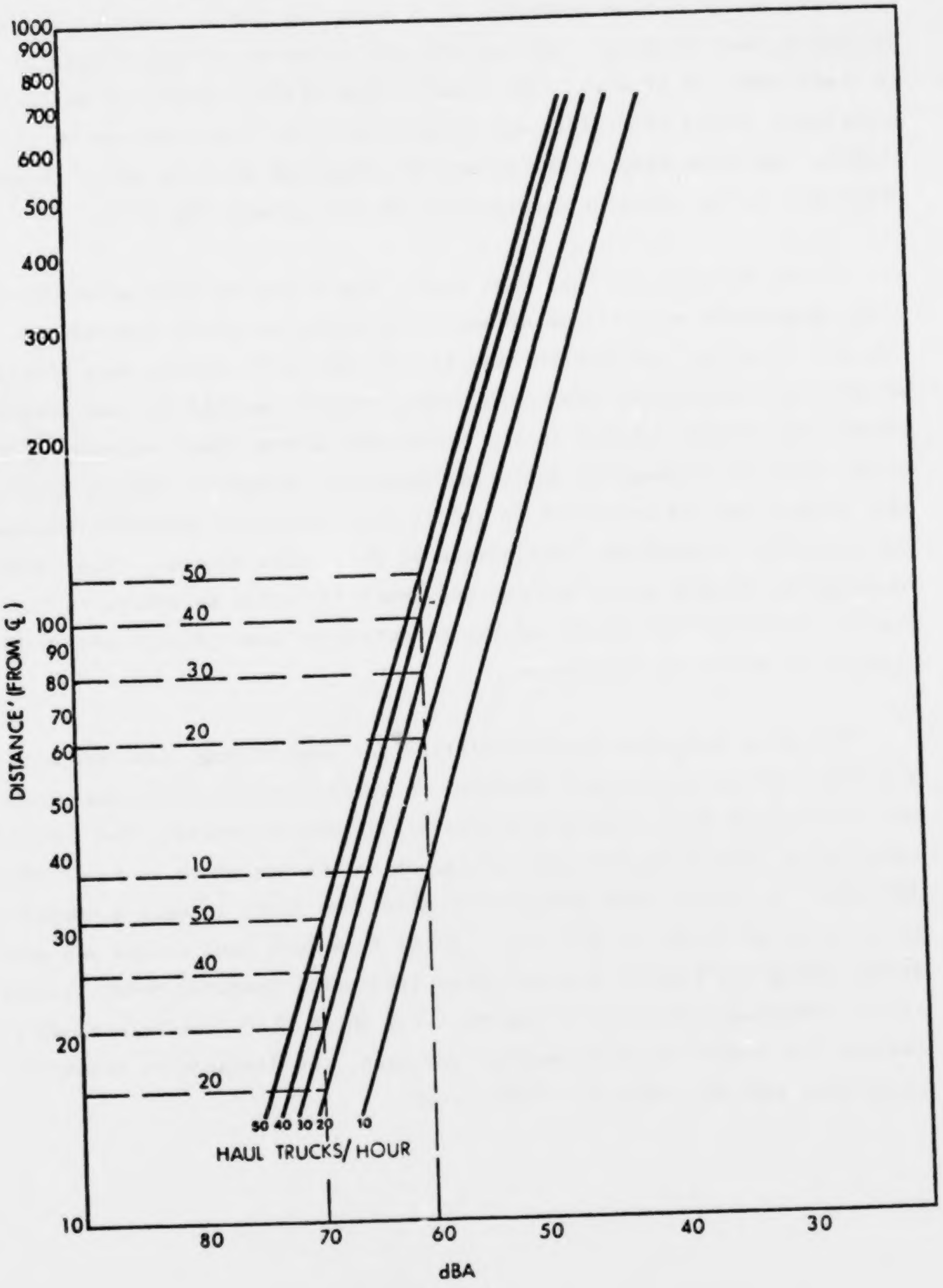
problems. In addition, blasting may cause physical damage to structures through vibration.

Nearly one-half of the population of this country is regularly exposed to levels of noise that interfere with normal activities such as speaking, listening, and sleeping. Many people are subjected to high levels of noise in their homes or at work. The suburbs near urban centers are beginning to experience levels of traffic and industrial noise once confined to the cities. And even deep in the country's parks and forests, quiet is often shattered by the noise of motorcycles and air planes (CEQ 1979).

In the Eastern Kentucky Coal Field, the rugged terrain necessitates the close geographic association of sensitive noise receptors (residences, schools, churches, and health care facilities) with certain coal mining activities. Railroads, coal haul roads, loadout facilities, and preparation plants are usually located in the relatively narrow river valleys along with other types of development including sensitive receptors. Noise from coal haul routes has the potential to affect many sensitive receptors because of the potential widespread distribution of this noise source. This close association between noise sources and sensitive noise receptors in the Eastern Kentucky Coal Field has the potential to cause significant noise impacts to sensitive receptors.

The noise emissions characteristics for coal mining, coal preparation, and coal transportation were modelled to obtain typical noise emissions that can be expected from these operations at various distances. The composite noise level from a typical coal mining operation was shown to be 79 dBA at 100 feet. A typical coal preparation plant was found to emit a composite noise level of 76 dBA at 100 feet. Noise from coal haul trucks was predicted using the Federal Highway Noise Prediction Computer Model, resulting in the nomograph indicated in Figure 4.7-2 which shows the relationship between the number of truck passbys per hour, the distance to sensitive receptors, and the resultant noise level.

Figure 4.7-2. Estimated noise levels (Leq) from coal haul trucks.



4.7.3 Mitigation of Air Quality Impacts

Fugitive dust emissions are the major adverse impacts of coal mining on air quality and can be mitigated by the following methods:

- wet suppression of dust;
- chemical stabilization;
- paving of haul roads;
- reduce speed of haul vehicles;
- stabilization of vegetative areas; and
- reduction of fall distance of coal, enclosure of dust resources, and exhaust systems at coal transfer points.

Wet suppression of dust using water or water plus a wetting agent is the most widely used fugitive emission control and can be employed for temporary control of dust from unpaved roads, materials handling, stock-piles, waste heaps, and general mining and construction activities during prolonged dry periods or when visible dust emissions occur. Chemical stabilization utilizes binding materials that, upon drying, bind with surface particles to form a crust which isolates the dust-forming material from climatic factors. The paving of coal haul roads is a very effective, although expensive, mitigative measure for reducing fugitive dust emissions. If unpaved roads must be used to transport coal, reducing the speed of haul vehicles on those roads can significantly reduce fugitive emissions by reducing the pulverization of road material and the turbulent wake of the haul vehicle. Vegetative stabilization can be used to reduce fugitive dust emissions from exposed soil areas, but is restricted to inactive areas where the vegetation will not be mechanically disturbed. Other dust emission control measures include the reduction of fall distances at material transfer points, enclosure of the dust source, and the use of exhaust systems to collect dust emissions.

4.7.4 Mitigation of Noise Impacts

Several techniques are available for the mitigation of coal mining induced noise impacts in the Eastern Kentucky Coal Field. These include site planning, equipment maintenance, use of noise barriers, personnel training, and operational noise restrictions.

- Site Planning - Initial site planning offers an excellent opportunity to implement abatement measures. At this time in the planning process, the location of the noise generating activities can be planned with sensitive noise receptors in mind. It is anticipated that with proper site planning most impacts can be eliminated by providing adequate buffer zones and topographical barriers.

- Equipment Maintenance - New and properly maintained equipment is generally quieter than older equipment. Noise sensitive components and noise control devices should be inspected and noise measurements made periodically with any necessary repairs and replacements made to maintain original equipment noise levels. Typical devices used for equipment noise abatement are mufflers, derating engines, and sealed and lubricated tracks. Abatement measures include engine vibration isolation, turbocharging, and lowered exhaust pipe exit height.

- Noise Barriers - The feasibility of erecting noise barriers in order to mitigate specific impacts can be assessed during the site planning stage. For example, mine vent fans are a stationary noise source throughout the mining operation, therefore noise shields around the fan would be an effective and feasible long term noise abatement measure. In addition, the use of barriers for surface mining operations seems very appealing in that overburden storage could provide an effective earth berm barrier.

- Personnel Training - Personnel should be made aware of the need for noise abatement. It may be desirable to implement a program to instruct equipment operators on the quietest use of their equipment.

- Operational Noise Restrictions - Time scheduling of operations during non-noise sensitive times can effectively reduce overall noise to acceptable levels. For instance, nighttime operation could be curtailed in areas where sensitive receptors are located, thus reducing the L_{dn} or $L_{eq}(24)$ values to acceptable levels.

4.8 SUMMARY

The impacts of coal mining and mining related activities as well as the mitigative measures to reduce or eliminate these impacts have been presented in this chapter. Table 4.8-1 presents a summary of the impacts of coal mining activities by resource category.

Table 4.8-1. Summary of mining impacts by resource for the Eastern Kentucky Coal Field.

EARTH RESOURCES	
Steep, Unstable Slopes	Undercutting, increased loading, removal of vegetation and alteration of hydrologic balance may result in landslides endangering public health and safety.
Toxic Overburden	Changes in chemical and biological conditions in soil, surface water, or groundwater may result in detrimental effects on aquatic organisms and plants, and hinderance to revegetation.
Floodplains	Modifications to the hydrologic capacity of streams may back-up flood water and increase sediment loads to streams with costs to individuals and business in the region.
WATER RESOURCES	
Surface Water	Surface disturbances can (1) reduce peak flood flows and increase base flows, (2) adversely affect water quality through the introduction of iron and manganese, acid mine water, and sediment loads, (3) reduce, alter in composition, or eliminate aquatic life, (4) reduce water use opportunities for domestic consumption and industrial processes, and (5) reduce waste assimilative capacity of downstream channels.
Groundwater	Contamination of aquifers by acid mine drainage from underground mines or migration of leachates from coal refuse and storage piles at coal preparation plants and dewatering of underground mines can adversely affect the quality and quantity of water at public and private water supply wells.
BIOLOGICAL RESOURCES	
Terrestrial Ecosystems (Including threatened or endangered species)	Mining can cause (1) elimination or disturbance of identified sensitive plant and animal sensitive habitats, and identified sensitive areas, and (2) reduction in the ability to successfully reclaim areas due to soil modification (changes in drainage patterns, disruption of nutrient recycling, changes in soil horizon composition).

Table 4.8-1. Summary of coal mining impacts by resource for the Eastern Kentucky Coal Field (cont.).

BIOLOGICAL RESOURCES (cont.)	
Aquatic Ecosystems (Including threatened or endangered species)	Mining can cause (1) elimination or disturbance of stream segments and other sensitive aquatic habitats (changes in groundwater inflow or changes in species composition) and (2) disturbance of receiving streams and rivers with increased AMD (lowers pH of receiving waters and increases availability of heavy metals) and sedimentation (stream scouring, smothering of benthic invertebrates, elimination of fish, high BOD loadings)
Wetlands	Mining can cause the elimination or disturbance of wetlands by changing the rate and quality of groundwater and surface water inflow and by altering soil moisture levels which can affect wetland vegetation.
LAND RESOURCES	
Environmentally Significant Agricultural (ESA) Lands	Mining can result in conversion of Prime Farmland (and other ESA categories) to non-farming uses reducing an already scarce resource in eastern Kentucky. ESA lands can also provide beneficial uses (runoff absorption, buffering of sensitive areas) other than food production that could be lost or reduced.
Recreational Lands	Mining can result in conversion of recreational land to non-recreational uses and/or pollution of recreation land adjacent to mining operations by noise, degraded water and/or visual effects.
HUMAN RESOURCES	
Economic Base	Heavy reliance on coal mining can lead to unforeseen fluctuations in employment due to the lack of industrial diversification, potentially affecting the social well-being of residents.
Population Growth	Mining can result in rapid population growth in areas without local labor supplies of sufficient size or skill, resulting in demand on the existing tax base of affected community and strains on infrastructure, including housing.
Transportation Networks	Transportation of coal by haul trucks can result in public safety problems and degradation of road surfaces due to the heavy weight of vehicles.

Table 4.8-1. Summary of coal mining impacts by resource for the Eastern Kentucky Coal Field (concluded).

CULTURAL RESOURCES	
Historic/Archaeological Sites	Mining operations, including haul roads can (1) destroy or alter sites, (2) isolate sites from their surrounding environment, (3) introduce elements out of character with the sites and their setting, (4) transfer or sell sites without conditions regarding maintenance or preservation, or (5) neglect the sites, allowing deterioration. Limited survey work in Eastern Kentucky increases the potential for impacting sites eligible for the National Register (i.e. not already listed).
AIR QUALITY AND NOISE	
Air Quality	Mining operations (blasting, loading, and preparation) and coal transportation on unpaved public and private haul roads can result in fugitive dust emissions at sensitive receptors, affecting public health and general welfare.
Noise	Mining operations (equipment and blasting) and coal transportation on public and private haul roads can increase ambient noise levels significantly for sensitive receptors located near the operations or along roads with high coal truck traffic, affecting public health and general welfare.

5.0 REGULATIONS GOVERNING MINING ACTIVITIES IN THE EASTERN KENTUCKY COAL FIELD

The National Environmental Policy Act of 1969 (NEPA; 42 USC 4321 et seq.) mandates the consideration of environmental factors by Federal decisionmakers during the evaluation of major Federal actions which may significantly affect the environment. The issuance of a New Source National Pollutant Discharge Elimination System (NPDES) permit by USEPA was defined by Congress in the Clean Water Act (CWA Section 511(c); 33 USC 1251 et seq.) to be a major Federal action. USEPA must thus conduct NEPA reviews when processing NPDES permits for the construction and operation of New Source coal mines and coal cleaning facilities.

USEPA's responsibilities in the regulation of coal mining operations are paralleled by those of the Office of Surface Mining (OSM) or the delegated State regulatory authority under the Surface Mining Control and Reclamation Act (SMCRA; PL 95-87, 30 USC 1201 et seq.) and by other government agencies. The issuance of mining and operations permits under SMCRA by OSM is subject to the provisions of NEPA, but OSM intends for these permits to be issued by State agencies. While State issuance of the SMCRA permit will not trigger NEPA compliance, the State programs will apply the environmental standards of SMCRA to coal mining activities.

The overlapping responsibilities of USEPA and OSM or their designated State regulatory authorities have been addressed in several Draft Memoranda of Understanding between USEPA and the Department of Interior (DOI) of which OSM is a part. These memoranda concern regulatory responsibilities related to such concerns as state program review, NEPA compliance requirements, and duplication of programmatic responsibilities. One such Memorandum of Understanding signed under the Carter Administration in November 1980 (45 FR 246) establishes an overall agreement outlining the responsibilities of each agency designed to substantially eliminate the potential for duplication. No such similar agreement, however, currently exists between USEPA and other Kentucky agencies, although one is contemplated. The development and implementation of a NEPA compliance strategy for USEPA is complicated by the uncertain status and often duplicative nature of these three levels of control over coal mining activities. This chapter provides an overview of the environmentally protective Federal and State laws and regulations that apply to coal mining operations and the interrelationships which exist between the responsibilities of the various agencies. It identifies the existing mechanisms which can control or eliminate the adverse impacts identified in Chapter 4.0. This chapter also identifies any remaining significant impacts in each resource area for further investigation in this EIA to mitigate through the USEPA NEPA compliance program.

5.2 USEPA's REGULATORY RESPONSIBILITIES

5.1.1 New Source Coal Mining Activities Under the NPDES Permit Program

Section 511(c)(1) of the Clean Water Act provides that the issuance by USEPA of a New Source NPDES permit is a major Federal action subject to the review provisions of NEPA. NPDES regulations originally addressed coal mines as existing sources of wastewater, focusing permit review on the attainment of minimum effluent limitations. The draft New Source Performance Standards (NSPS) for the coal mining point source category were issued 17 September 1977 and activated the New Source NPDES permit program for the industry. The final standards were published 12 January 1979 (44 FR 9:2586-2592). New Source coal mining facilities requiring NEPA review include the following:

- Coal preparation facilities for which construction is initiated after 17 September 1977, independent of coal mine permit areas.
- Surface and underground mines that are assigned identifying numbers by the US Mine Safety and Health Administration (MSHA) on or after 17 September 1977.
- Surface and underground mines with earlier MSHA numbers that meet one or more of the following criteria.
  -Begin to mine a new coal seam.

- Discharge effluent to a new drainage basin.
- Cause extensive new surface disruption.
- Begin construction of a new shaft, slope, or drift.
- Acquire additional land or mineral rights.
- Make significant additional capital investments.
- Otherwise have characteristics deemed appropriate by the Regional Administrator to place them in the New Source category.

The decision of whether a mine is a New Source is determined for each individual project, based largely on the information supplied with the permit application. At a minimum, New Source coal mines must meet the New Source Performance Standards for the industry if they propose to discharge wastewater into the surface waters of the United States. The effluent limitations apply only to wastewater discharged from active mining areas. Runoff from lands undergoing reclamation are considered a sub-category separate from active mines and coal preparation plants. USEPA best practices guidelines for coal mining (Best Practices for New Source Surface and Underground Coal Mines, 1 September 1977 memorandum to Regional Administrators incorporated by reference in the New Source discharge limitations) mandate that mine plan engineering must prevent, minimize, or mitigate the discharge of any noxious materials that would adversely affect downstream water quality or uses following the temporary or permanent closing of a mine.

Each New Source coal mine as described above must obtain an NPDES permit prior to commencement of point source discharge(s) from the site. The application for an NPDES permit is subject to the NEPA review process described in Section 5.1.2. The NEPA review requirement during the permit process allows: (1) public and interagency input to the NPDES permit review process prior to the initiation of mine site discharges; (2) effective environmental review and consideration of alternatives that may avoid or minimize adverse effects; and (3) development of environmentally protective permit conditions. This review may include a full Environmental Impact Statement (EIS) and/or various less extensive forms of environmental review and mitigation.

5.1.2 Applicable Laws and Regulations Under NEPA

Federal regulations and laws applicable under the provisions of NEPA protect many environmental resources including the following:

- Surface and groundwater quality
- Sensitive ecosystems
- Floodplains
- Wild or scenic rivers
- Wetlands
- Endangered species habitat
- Environmentally Significant Agricultural lands
- Recreational land uses
- Noise and vibration levels
- Historic, archaeologic, and paleontologic sites
- Community integrity and quality of life
- Air quality
- Geologic and soil characteristics.

Under the provisions of NEPA, USEPA is required to make every reasonable effort to preserve and enhance the quality of the environment through the protection of these resources. The sections that follow describe the regulatory framework which provides for the protection of these resources under USEPA's NEPA responsibilities.

5.1.2.1 Surface and Groundwater Quality

The primary goals of the Clean Water Act (CWA) are to make the waters of the Nation fishable and swimmable by 15 June 1983 and to eliminate water pollution by 1985. As one means to accomplish these goals, the Congress established the NPDES permit program. Coal mining is one of 21 industrial categories (New Sources) for which more stringent effluent limits were required. The eventual goal of the NPDES program is the elimination of all pollutant-laden discharges to the Nation's waters.

Section 303(e) of CWA provides the Commonwealth of Kentucky with the opportunity to establish baseline water quality data, stream management objectives, and stream water quality criteria to protect the established water uses. The New Source NPDES permit program, in turn, can be tailored to achieve a desirable level of environmental protection through the utilization of the NEPA review process and the application of discharge limitations that are based on specific water quality management objectives and that may be more stringent than the nationwide New Source standards.

The New Source Performance Standards (NSPS) finalized on 12 January 1979 provide for effluent limitations from new coal mining activities based on the use of the best available demonstrated control technology (BACT). The limitations do not apply to: (1) overflow or bypass discharge that may result from a storm of 24-hour duration and 10-year return period (or equivalent snowmelt); (2) overflow or bypass discharge caused by any precipitation or snowmelt where the treatment facility is designed and maintained to treat the volume of water covered by the regulations during a 10-year, 24-hour discharge-precipitation event (44 FR 250:76791, 28 December 1979); and (3) drainage from areas other than active mining areas provided that such drainage is not commingled with untreated mine drainage that is subject to the limitations. Provision also is made for a higher pH in the final effluent where the effective removal of manganese requires a pH above 9.

5.1.2.2 Sensitive Ecosystems

Implementation of the more stringent NSPS provides additional protection to aquatic ecosystems beyond the requirements of the existing source discharge limitations. The USEPA Administrator may impose even more stringent limitations where such are considered necessary to provide a greater degree of protection to sensitive aquatic ecosystems. These more stringent limitations may be appropriate for stream segments that include spawning grounds of game fish such as trout or the habitat of mussels endangered with extinction. The Administrator also may suggest permit conditions such as requirements for large buffer areas adjacent to especially sensitive stream segments. Sediment control structures that provide more environmental protection than would be afforded by structures constructed under BACT also could be mandated. This imposition of more stringent limitations by the Regional Administrator, however, has rarely, if ever, been stipulated.

The Fish and Wildlife Coordination Act of 1958 (PL 89-72) requires USEPA and any other Federal agency to consult and coordinate with the US Fish and Wildlife Service when streams and other water bodies are altered. In addition, the DOI and the US Department of Agriculture (DOA), as well as appropriate Kentucky agencies will have the opportunity to comment on terrestrial ecosystem impacts during the New Source NPDES permit review process. Based on the comments received during the review process, USEPA can propose revisions to permit applications or suggest permit conditions that will mitigate impacts on terrestrial ecosystems if necessary. In this way, USEPA can assist in the conservation and protection of terrestrial ecosystems.

5.1.2.3 Floodplains

Undeveloped floodplains are protected by Executive Order 11988 as implemented by guidelines of the Water Resources Council (43 FR 29:6030-6055, 10 February 1978). USEPA, under the provisions of Executive Order 11988, must avoid wherever possible the long- and short-term impacts associated with the occupancy and modification of floodplains and avoid direct and indirect support of floodplain development wherever there is a practicable alternative. The Agency must also incorporate floodplain management goals into its planning, regulatory, and decisionmaking processes. To the greatest extent possible USEPA must:

- Reduce the hazard and risk of flood loss and, wherever it is possible, to avoid direct or indirect adverse impacts on floodplains;
- Where there is no practical alternative to locating in a floodplain, minimize the impact of floods on human safety, health, and welfare, as well as the natural environment;
- Restore and preserve natural and beneficial values served by floodplains;
- Require the construction of USEPA structures and facilities to be in accordance with the standards and criteria of the regulations promulgated pursuant to the National Flood Insurance Program;

- Identify floodplains which require restoration and preservation and recommend management programs necessary to protect these floodplains and include such considerations as part of on-going planning programs; and

- Provide the public with early and continuing information concerning floodplain management and with opportunities for participating in decisionmaking including the (evaluation of) tradeoffs among competing alternatives.

5.1.2.4 Wild or Scenic Rivers

The Wild and Scenic Rivers Act (16 USC 1274 et seq.) provides that the Secretary of Agriculture or Interior and the KDNREP review and comment on permit applications that affect designated wild and scenic rivers or rivers that are being considered for such designation. USEPA cannot assist through grant, loan, license, permit or otherwise, the construction of a project that would have a direct and adverse effect on rivers designated as wild and scenic under Section 3 of the Act or those designated as having potential for inclusion under Section 5 of the Act. If, after proper consultation with the Secretary of Agriculture or Interior, an action is found to have a direct and adverse impact, USEPA must provide mitigative measures. No action may be taken if the adverse effect cannot be avoided and approval from the appropriate Secretary cannot be obtained.

5.1.2.5 Wetlands

Executive Order 11990, Protection of Wetlands, requires USEPA to avoid, to the greatest extent possible, the adverse impacts associated with the destruction or loss of wetlands and to avoid support of new construction in wetlands if a practicable alternative exists. The USEPA Statement of Procedures on Floodplain Management and Wetlands Protection (5 January 1979) requires that USEPA determine whether proposed actions will be in or will affect wetlands. If so, the responsible official must prepare a wetlands assessment which will be part of the environmental assessment or environmental impact statement. The responsible official shall either avoid adverse impacts or minimize them if no practicable alternative to the action exists.

In addition, Section 404 of CWA requires Army Corps of Engineers permit approval for activities that would result in the placement of fill in wetlands. The US Department of Agriculture, US Fish and Wildlife Service, US Army Corps of Engineers, KDNREP, and the public have opportunity to review and comment on NPDES permit applications that propose activities that may affect wetlands. These comments may address the identification of impacts, mitigative measures, and additional regulatory activities on a case-by-case basis.

5.1.2.6 Endangered Species Habitat

The USEPA is prohibited under the Endangered Species Act of 1973 (16 USC 1531 et seq.) from jeopardizing species in danger of extinction or threatened with endangerment and from adversely modifying habitats essential to their survival. NEPA requires USEPA to identify all designated endangered or threatened species or their habitats that may be affected by an NPDES permitting action. If such identified species or their habitats may be affected, consultation with the US Fish and Wildlife Service under Section 7 of the Act is required. If the consultation reveals that the action will adversely affect a listed species or habitat, acceptable mitigation measures must be undertaken or the proposed action terminated.

5.1.2.7 Environmentally Significant Agricultural Lands

It is USEPA policy to consider the protection of Environmentally Significant Agricultural lands from irreversible conversion to uses which result in its loss as an environmental or essential food production resource. This policy is stated in USEPA's Policy to Protect Environmentally Significant Agricultural Lands (Policy memorandum from Douglas Costle, Administrator, to Assistant Administrator, Regional Administrators, and Office Directors, 8 September 1978). Significant agricultural lands include the prime, unique, and additional farmlands with national, statewide, or local significance as defined by the US Department of Agriculture, Soil Conservation Service. USEPA has a special interest in protecting farmlands that: (1) are within or contiguous to environmentally sensitive areas and that protect or buffer such areas; (2) are suitable for the land treatment of organic wastes; or (3) have been improved with significant capital investments for the purpose of soil erosion control. USEPA may modify or deny a New Source NPDES permit application that proposes coal mining activities on significant agricultural lands if that application includes inadequate provisions for the avoidance or mitigation of adverse impacts to such lands.

5.1.2.8 Recreational Land Uses

Agencies that coordinate with USEPA during the review of NPDES New Source permit applications have the responsibility and authority to ensure that recreational land uses are not adversely affected by the proposed actions. If USEPA review of the application indicates that recreational land uses will be unacceptably disturbed, after the preparation of an EIS USEPA can deny the permit, suggest special permit conditions, or prepare revisions to the application for such a permit. Additional protection is provided to various types of recreational land through the provisions of the Wilderness Act of 1964 (16 USC 131-1136), Wild and Scenic Rivers Act of 1976 (PL 90-542, as amended through PL 94-486), and the Endangered Species Act of 1973 (16 USC 1531 et seq.).

5.1.2.9 Noise and Vibration

USEPA is required by its NEPA responsibilities to ensure that New Source activities will not directly or through induced development have significant adverse effects upon local ambient noise levels. As a condition to a New Source NPDES permit, USEPA may require that blasting be performed according to the most stringent applicable performance standards that are promulgated and enforced by the OSM, MSHA, and KDNREP. The permit applicant may be asked to supply to USEPA data on noise receptors and proposed operations. USEPA may attach conditions to the permit that restrict operating hours and equipment noise levels if such restrictions are necessary to protect the health, safety, or welfare of affected parties.

5.1.2.10 Historic, Archaeologic and Paleontologic Sites

USEPA is subject to the requirements of the National Historic Preservation Act of 1966 as amended (16 USC 470 et seq.), the Archaeological Historic Preservation Act of 1974 (16 USC 469 et seq.), and Executive Order 11593 entitled "Protection and Enhancement of the Cultural Environment." These provisions and regulations establish review procedures which USEPA must follow when significant cultural resources are or may be involved.

Under Section 106 of the National Historic Preservation Act and Executive Order 11593, if a USEPA undertaking affects any property with historic, architectural, archaeological, or cultural value that is listed on or eligible for listing on the National Register of Historic Places, the responsible official shall comply with the procedures for consultation and comment promulgated by the Advisory Council on Historic Preservation in 36 CFR Part 800. Such undertakings include any new and continuing projects and program activities carried out pursuant to a Federal permit (36 CFR 800.2). The responsible official must identify properties affected by the undertaking that are potentially eligible for listing on the National Register and shall request a determination of eligibility from the Keeper of the National Register, Department of the Interior, under the procedures in 36 CFR Part 63.

Under the Archaeological and Historic Preservation Act, if a USEPA activity may cause irreparable loss or destruction of significant scientific, prehistoric, historic, or archaeological data, the responsible official or the Secretary of the Interior is authorized to undertake data recovery and preservation activities. Applicable procedures are found in 36 CFR Parts 64 and 66.

USEPA will issue a New Source NPDES permit for mining operations that will affect a National Register site only after appropriate interagency coordination has been pursued. The applicant may be asked to furnish site-specific information to enable USEPA in cooperation with the SHPO to determine whether any resources potentially eligible for the National Register are to be affected by proposed mining activities.

5.1.2.11 Community Integrity and Quality of Life

Under the provisions of NEPA (40 CFR 1508.14) the evaluation of impacts on the human environment is to be considered broadly. This means that the preparation of an environmental impact statement must include the consideration of effects on the social and economic environment as well as the natural and physical environment. "Effects" is to include not only those directly caused by the action, but also those reasonably foreseeable as indirectly resulting from the action. Such indirect effects may include growth inducing effects and other impacts related to induced changes in the pattern of land use, population density or growth rate (40 CFR 1508.8). Consequently, USEPA's environmental evaluation requirements triggered by NEPA compliance includes the analyses of local social and economic impacts and incorporates this consideration into the NPDES review process.

5.1.2.12 Air Quality

Because the granting of a New Source NPDES permit by USEPA is considered a major Federal action subject to NEPA compliance, air quality impacts must be addressed. USEPA addresses the impact on air quality pursuant to the provisions of the Clean Air Act (CAA; USC 7401-7642 as amended by 88 Stat. 246, 91 Stat. 684, and 91 Stat. 1401-02). This permit program is administered by the KDNREP under a program approved by USEPA.

Ambient air quality standards (40 CFR 50) specify the ambient air quality that must be maintained outside the project boundary or within the boundary where the general public has access. Standards designated as primary are those necessary, with an adequate margin of safety, to protect the public health; secondary standards are those necessary to protect the public welfare from any known or anticipated adverse effects of an air pollutant.

In 1974, USEPA issued regulations for the prevention of significant deterioration of air quality (PSD) under the 1970 version of the Clean Air Act (PL 90-604). These regulations established a plan for protecting areas that possess air quality which currently is cleaner than the National Ambient Air Quality Standards (NAAQS). Under USEPA's regulatory plan, clean air areas of the Nation could be designated as one of three classes. The plan allows specified numerical increments of air pollution increases from major stationary sources for each class up to a level considered to be significant for that area. Class I areas need extraordinary protection from air quality deterioration and only minor increases in air pollution levels are allowable. Under this concept, virtually any increase in air pollution in Class I (pristine) areas would be considered significant. Class II increments allow for increases in air pollution levels that usually accompany well-controlled growth. Class III increments allow increases in air pollution levels up to the NAAQS.

5.1.2.13 Geology and Soils

Section 102(c) of NEPA requires that all agencies of the Federal government must include in "every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment, a detailed environmental impact statement." During the course of its NEPA review of New Source NPDES permit applications, USEPA will consider potential adverse impacts that could result from mining in unstable, acid-forming, or exceptionally erosive geologic or soil conditions.

5.1.3 USEPA's Consolidated Permit Program

In an effort to streamline their various permitting activities, USEPA proposed regulations consolidating the procedures which govern the issuance of permits under five separate permit programs (44 FR 34244, 14 June 1979). These regulations were published in the Federal Register (45 FR 33066, 19 May 1980). The five programs covered by the proposed regulations are: (1) Hazardous Waste Management Program under the Resource Conservation and

Recovery Act; (2) Underground Injection Control Program under the Safe Drinking Water Act; (3) NPDES permits under CWA; (4) Dredge or Fill Program under CWA; and (5) Prevention of Significant Deterioration Program under the Clean Air Act. The adoption of this program is still tentative, however.

5.1.4 Regulatory Timetable and NEPA Implementation Procedures

USEPA follows a multistep procedure for NEPA compliance. This procedure includes provisions for: (1) the early identification of candidate New Source applicants; (2) an initial request for information from each New Source permit applicant; (3) a preliminary NEPA/NPDES decision either to prepare an EIS or to defer the EIS preparation pending the review of additional information from the applicant; (4) a second request to the applicant for additional information (if needed), preparation of an Environmental Information Document (EID), or a third party EIS; (5) a final decision to prepare an EIS or to issue a finding of no significant impact (FONSI) based on an EID or the other information requested; (6) the preparation of an EIS (if necessary) or the issuance of a FONSI; and (7) the issuance or denial of a draft New Source NPDES permit with appropriate permit conditions for public review and comment. This decisionmaking process is shown schematically in Figure 5.1-1.

5.1.4.1 Identification of New Source Applicants

The publication of the final New Source Performance Standards for the coal mining point source category (12 January 1979) activated the New Source NPDES permit program for the industry. The USEPA criteria for identifying a mining operation as a New Source are indicated in Section 5.1.1. The New Source NPDES regulations require that an applicant for a New Source NPDES permit must receive the permit prior to causing a point source discharge. Hence, it is advantageous to the applicant that contact with USEPA Region IV be initiated early in the planning process.

Prior to the publication of the New Source Performance Standards, the NPDES regulations addressed coal mines only as existing sources of wastewater. Currently, USEPA Region IV relies on the Water Management Division

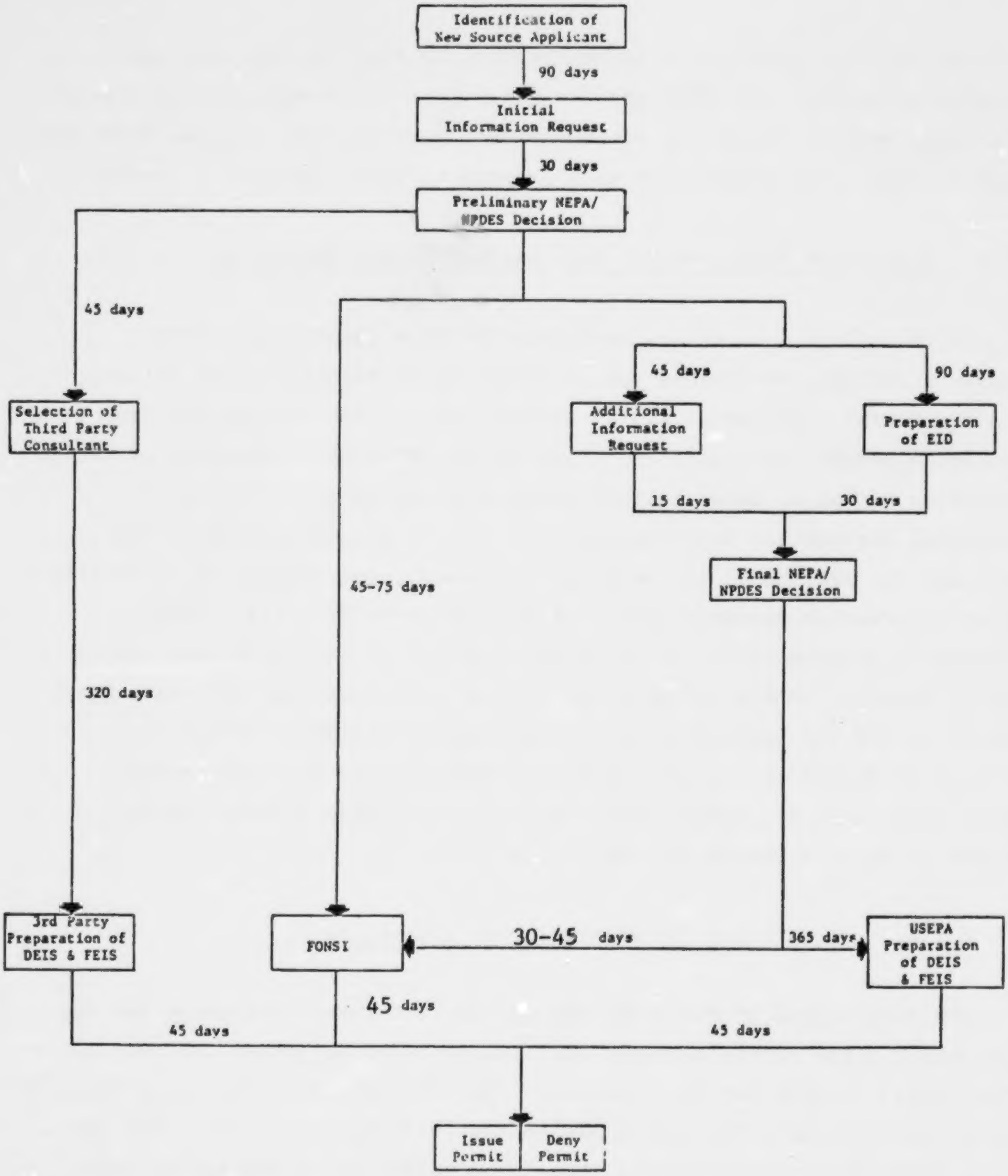

Identification of New Source Applicant
90 days
Initial Information Request
30 days
Preliminary NEPA/ NPDES Decision
45 days
45 days
90 days
Selection of Third Party Consultant
Additional Information Request
Preparation of EID
15 days
30 days
Final NEPA/ NPDES Decision
45-75 days
320 days
3rd Party Preparation of DEIS & FEIS
FONSI
30-45 days
365 days
USEPA Preparation of DEIS & FEIS
45 days
45 days
45 days
Issue Permit
Deny Permit

Figure 5.1-1. General NEPA compliance procedures for USEPA's NPDES program.

Notes: The number of days required to complete any of the paths can be determined by adding the days noted next to each aspect of the process.

to identify New Source coal mining activities from NPDES permit applications.

5.1.4.2 Initial Information Submittal

If it is determined that a particular applicant may qualify as a New Source under NPDES regulations, USEPA will conduct a New Source meeting to determine whether the applicant is a New Source and to inform him of the New Source requirements. An environmental information request is given to the applicant at this meeting. The applicant is requested to supply information to the USEPA EIS Branch, Region IV. A letter is subsequently sent by USEPA officially informing the applicant of the New Source determination. The environmental information requested currently includes the following types of information:

- Present land use and vegetative cover including public access roads and residences.
- Proposed method of mining and transporting coal, including haul routes.
- Water requirements and source of water supply.
- Water pollution control system and sediment control structures.
- Presence of nearby wells and proposed monitoring program.
- Estimated noise levels for mining equipment and coal haul traffic near sensitive receptors.
- Methods to control fugitive dust emissions on unpaved public and private haul routes.
- Refuse handling plan and expected composition of coal refuse (including toxic wastes).
- Documentation of contact with appropriate State and/or Federal agencies regarding historic and archaeological sites, wild and scenic rivers, recreation areas, habitats of threatened and endangered species, wetlands, floodplains, environmentally significant farmland, and Federal lands.

The environmental information requested also includes maps indicating the layout of the proposed facility and the geology and groundwater flow of the area.

The applicant's preparation of the environmental information normally takes up to 90 days. If the applicant opts to supply data prior to the New Source determination, the timeframe can be reduced.

5.1.4.3. Preliminary NEPA/NPDES Decision

Based on the information submitted to USEPA as well as other information sources, USEPA will take one of the following actions:

- Determine that the proposed New Source coal mining facilities will produce no significant impacts on the environment (FONSI);
- Recommend that the permit applicant initiate the preparation of an EIS;
- Request additional, resource-specific information from the applicant or from government agencies that have permit review responsibilities;
- Direct the permit applicant to prepare a detailed analysis of alternatives to the proposed action.

This preliminary decision will be based on the adequacy of the available information to indicate to what extent the proposed coal mining activity would affect the environment and to what extent adverse effects could be avoided, minimized, or mitigated through the implementation of the proposed facility plans with or without special USEPA conditions or stipulations. The options which could result from this preliminary NEPA/NPDES decision are discussed in the following sections. Normally, 15 to 30 days are required by USEPA to make this preliminary decision.

Finding of No Significant Impact

In cases where no significant impacts would result from a proposed coal facility or when a set of permit conditions agreeable to the applicant can modify the project to where no significant impacts will result, USEPA can issue a Finding of No Significant Impact (FONSI). USEPA review requirements to make this determination normally take 30 to 45 days. USEPA encourages permit applicants to integrate environmentally protective measures into the initial stages of the mine planning process. The applicant thus may avoid the costly delays or changes in plans that could result from the need to prepare an EIS or the suggestion of permit conditions by USEPA.

Permit conditions could take one of several possible forms. The USEPA document "Best Practices for New Source Surface and Underground Coal Mines" includes several examples of conditions that could be added to an approved NPDES permit such as special requirements for spoil handling, reclamation activities, and mine abandonment procedures. The Best Practices guidelines have not been published formally, but they are incorporated by reference into the NSPS promulgated on 12 January 1979. The guidelines were issued on 1 September 1977 in a memorandum to Regional Administrators that provides interim guidance on the application of NEPA to New Source coal mining activities. The Best Practices guidelines currently are being revised by USEPA.

If the NEPA decision is to issue a FONSI, the NPDES permit can be issued following the public notice period if no serious objections are raised regarding significant impacts.

Third Party Preparation of Draft and Final EIS

During the preliminary NEPA review, USEPA may decide that an EIS probably will be required on the proposed project. The applicant and USEPA jointly can choose to employ a third party consultant to prepare the EIS. If the third party method is desired by the applicant, the proposed consultant must be approved and directed by USEPA. USEPA criteria for approval of a third party consultant include assuring the objectivity of the consultant and the expertise in the preparation of environmental impact statements.

USEPA encourages the use of the third party EIS procedure. The third party method has the compelling advantage of potentially reducing the applicant's processing time for approval or disapproval of a permit application when an EIS will be required. This benefit results from a single consultant performing the collection and analysis of the baseline environmental data concurrent with the preparation of the mine plan and the EIS. The integrated third party procedure is monitored closely by USEPA to assure the integrity of the final product. No opportunity is provided for prior review of third party work products by the applicant. USEPA retains the ultimate responsibility, to accept, modify, or reject any portion of the EIS prepared by the third party. To ensure the technical integrity of the EIS, the third party may be requested to furnish to USEPA all of the environmental data that are collected in conjunction with the EIS.

Each EIS must address a standard range of topics (CEQ Regulations 150.10-150.18; 40 CFR Part 6; 44 FR 216: 64174-64193, 6 November 1979):

- The environmental impact of the proposed action;
- Any adverse, unavoidable environmental effects that would result from implementation of the proposed action;
- Alternatives to the proposed action;
- The relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity; and
- Any irreversible and irretrievable commitments of resources that may result from the proposed action.

The intent of the CEQ regulations and EPA's EIS preparation is to focus on reasonable alternatives.

Close coordination between the consultant and USEPA is necessary to ensure that the environmental review requirements are being fulfilled. The length of time required to complete the third party EIS varies with the applicant's needs, but it can normally be completed in less than a year (320 days).

Additional Information Submittal

The preliminary NEPA analysis described in Section 5.1.4.3. may indicate that additional information is needed to facilitate a more thorough assessment of the environmental effects of the proposed facility on one or more significant resources which may experience adverse impacts. For example, if the preliminary information at Region IV's disposal indicates the presence of toxic overburden, USEPA may require the applicant to conduct a systematic overburden analysis as described in the USEPA document "Field and Laboratory Manual for Overburden Analysis" (EPA-600/2-79-054) or to provide the results of such an analysis prepared for another agency. The applicant's response to this type of tailored information request, together with the data that previously were available, will provide the substantive input for the final NEPA decision on the permit application (Section 5.1.4.4.). Generally, approximately 45 days are required by the applicant to respond to this information request although a longer or shorter timeframe may be appropriate depending on the complexity of the request.

Environmental Information Document

In cases where several environmental resources are inadequately characterized by the available data or in cases that require close review because of their complex or controversial nature, USEPA may require the permit applicant to collect appropriate new data and prepare an evaluation of alternatives based on those data. This document (called an Environmental Information Document [EID]) provides USEPA and the permit applicant with the opportunity to assemble and review relevant environmental information, alternatives to the project, impacts of the proposed project and available mitigative measures. Published USEPA guidelines are available that describe the preparation of this evaluation for surface coal mines (EPA-130/6-79-005).

The major emphasis of the EID is directed toward identifying available alternatives and their impacts. USEPA requires the EID where it is determined that an EIS would be required and the applicant chooses not to use the third party EIS process. In this case, the presentation and evaluation of all reasonable alternatives in the EID is necessary.

The permit applicant may elect to prepare an unsolicited EID on the basis that one or more of the previously listed sensitive features or conditions is certain to require the analysis of operational features for the proposed facility. To ensure that this independent, unsolicited effort is directed toward the appropriate issues, all applicants for New Source NPDES permits are strongly urged to make early, voluntary contact with USEPA Region IV for guidance on preparing permit applications and supporting documents and to discuss the potential advantages of the third party process.

The form and content of each solicited EID is determined by the USEPA official responsible for conducting the environmental review of the permit application. The official may require that the EID address all reasonable alternatives and their impacts on any or all of the following topics:

- Cultural Resources
    - -Archaeological sites
    - -Historical sites
    - -Community integrity and quality of life
    - -Acoustic environment
    - -Recreational land uses
    - -Wild and scenic rivers
- Topography
    - -Unstable terrain features
    - -Steep slopes
- Climate
    - -Rainfall
    - -Snowfall
    - -Temperature
    - -Wind speed and direction
    - -Severe weather events
- Ecological Resources
    - -Sensitive ecosystems
    - -Habitats of endangered or threatened species
    - -Wetlands
    - -National natural landmarks
- Vegetation
    - -Species composition and distribution of types
    - -Importance as wildlife habitat
    - -Local and regional uniqueness
    - -Noteworthy specimens or associations of plants
    - -Threatened or endangered species
    - -Species of economic importance

- Wildlife habitat for resident or migratory species
    - -Amphibians
    - -Reptiles
    - -Birds
    - -Mammals
    - -Threatened or endangered species
    - -Game species
- Water Resources
    - -Surface water features, including:
        - Seeps
        - Springs
        - Streams
        - Impoundments
        - Wetlands
    - -Surface water hydrology
    - -Drainage basin areas
    - -Low flow of streams
    - -Mean flow of streams
    - -Flood flow of streams
    - -Flood control plans
    - -Flood control structures
    - -Groundwater
    - -Water quality parameters
        - Temperature
        - pH
        - Acidity
        - Alkalinity
        - Hardness
        - Dissolved oxygen
        - Total suspended solids
        - Total dissolved solids
        - Turbidity
        - Sulfate
        - Ammonia
        - Concentrations of total dissolved iron, manganese, zinc, aluminum, and nickel

- Air Quality
    - -Particulates
    - -NO_x
    - -Other parameters that may be required by the Regional Administrator

- Geoenvironmental Resources
    - -Prime agricultural lands
    - -High sulfur coal seams
    - -Toxic overburden
    - -Floodprone areas
    - -Steep slopes (greater than 25%)

- Coal transfer activities
    - -Raw coal transport to cleaning facility
    - -Raw coal transfer to stacking hopper

    - Stacking
    - Raw coal storage
    - Raw coal transfer to cleaning operation
    - Coal fine transfer to gob pile
    - Cleaned coal transfer to storage and transportation facilities
    - Cleaned coal transport

- Coal cleaning activities
    - Preliminary sizing (wet processes)
    - Dry crushing and sizing
    - Pneumatic separation
    - Thermal drying
    - Dryfeed and product transfer and loading

- Geotechnical properties of coal seam and overburden materials
    - Compressive strength
    - Mineralogy
    - Structure
    - Tensile strength

Applicant information submitted in the EID will provide USEPA with information on which to base the final NEPA/NPDES decision (Section 5.1.4.4.). Due to its complexity, an EID may require 90 days or more to complete.

5.1.4.4 Final NEPA Decision

Based on an EID or an applicant's responses to specific information requests, USEPA will make a final decision to prepare an EIS or issue a FONSI. The decision will account for all of the environmental effects of the proposed facility that are to be avoided, minimized, or mitigated by the applicant's proposed mining procedures and agreement to follow these procedures or practices through permit conditions.

The final NEPA decision will result from the culmination of the various levels of environmental review performed by USEPA. This review is designated to determine those New Source permit applications which: (1) warrant the preparation of an EIS; (2) warrant approval with no further review because they do not result in significant environmental effects; or (3) warrant that conditions be negotiated in order to mitigate or minimize potential environmental impacts. USEPA makes this final decision in approximately 30 to 45 days from receipt of additional information. Additional time may be required for complex projects where EID's have been prepared.

Finding of No Significant Impact

The demonstrated absence of significant environmental impacts or a reasonable assurance that the permit applicant will avoid, minimize or mitigate the adverse impacts would lead to the issuance of a FONSI. The details of FONSI's are addressed in Section 5.1.4.3.

USEPA Preparation of EIS

USEPA would prepare a draft and final EIS where it has been determined that significant unmitigated adverse impacts would result from the project and where the applicant has previously decided not to use a third party consultant. The same EIS requirements as previously discussed in Section 5.1.4.3. are applicable. However, the time required to complete the NEPA process would be extended. Contracting procedures and the availability of contract funds for EIS preparation contracts can significantly affect schedules.

5.1.4.5 Issue or Deny Permit

The USEPA NEPA compliance procedure ultimately results in either the issuance, issuance with conditions, or denial of the New Source NPDES permit. The decision to take one of these courses of action could occur early or later in the review of the project. The denial of any permit application would be based on the finding that the New Source coal mining activity cannot operate without significant adverse impact to the environment even with appropriate mitigative measures and that the public benefit from the mining is less than the public damage from the mining. This decision could take 45 or more days depending on the complexity of issues. The applicant is notified of this decision and its basis.

Issuance of the permit could take one of several forms. USEPA may determine that the New Source facility as proposed or modified will have no significant effect on the environment and issue a FONSI without conditions. After appropriate public review, the permit would be issued. The permit may also be granted with conditions or stipulations based either on proposed actions by the applicant, USEPA review during the screening procedures, public review and comment, or review and comment by other State or Federal agencies during EIS review. Depending on the steps taken to reach this decision, 45 or more days may be required for permit issuance.

5.2 OSM's REGULATORY RESPONSIBILITIES

5.2.1 The Surface Mining Control and Reclamation Act

The major goals of the Surface Mining Control and Reclamation Act (SMCRA) as passed in 1977 are:

- To set a national standard and define a detailed program for mining coal and reclaiming land;
- To prohibit mining from areas where reclamation is not feasible;
- To balance the agricultural productivity of land against coal resources and ensure adequate production from and protection of both;
- To allow the public to participate in decisions affecting the environment when it might be affected by coal mining;
- To achieve reclamation of previously mined and abandoned lands.

The Federal Government through the Department of Interior's Office of Surface Mining (OSM) has taken the lead in establishing the national surface mining regulatory program. The Act provides for a shift of responsibility and authority to the states through the submittal of a program by each state to OSM for approval. Kentucky's proposed program was submitted to OSM during March 1980 with a decision on primacy expected between 3 September 1980 and 3 January 1981. A court injunction, however, delayed Kentucky's submittal of the final program and primacy is not expected until late 1982. Even if primacy is granted to Kentucky, OSM will continue to play a role by: (1) conducting an oversight program to make sure the State program is operating satisfactorily; (2) regulating mining on Federal lands within Kentucky; and (3) identifying imminent hazards to public health and the environment.

SMCRA regulates all surface mines and many underground mines that require New Source NPDES permits. SMCRA also regulates freestanding coal preparation plants located outside the permit areas of active mines. Underground mines will be regulated under SMCRA unless they will disturb less than 0.8 ha (2 ac) of surface lands including haul roads. Substantial exploration activities also require permits under SMCRA.

The regulations governing activities subject to SMCRA were published 13 December 1977 as interim standards (42 FR 62639). These interim regulations will be superseded by the permanent regulatory program published 13 March 1979 (44 FR 15313) and the approved State program. The final regulations are substantially different from the interim regulations and the latter includes only those environmental performance standards of 30 CFR Parts 715 through 718, the inspection and enforcement procedures of Parts 720 through 723, and the reimbursements to States of Part 725. Until the State program is approved, interim regulations governing coal mining are in effect and enforced by the Kentucky Bureau of Surface Mining Reclamation and Enforcement.

The permanent regulations of OSM would apply existing source NPDES discharge limitations to areas undergoing reclamation and revegetation. OSM expects eventually to use the USEPA New Source limitations as the standards for all reclamation regulated by SMCRA (43 FR 181:41744-41745, 18 September 1978). The OSM regulations are currently undergoing many changes. Various regulations have been amended, many have been suspended, and still others are in the process of being rewritten. The final form of OSM's permanent SMCRA program is unknown at this time and therefore, the following sections primarily outline the requirements of the interim program.

5.2.2 Mining Performance Standards Under SMCRA

By the authority designated in Title V of the Act (Sections 501-529), the final Federal regulations which implement SMCRA set forth minimum performance standards describing how coal must be mined and what reclamation activities are required to protect the environment and public health. Title V of the Act establishes the requirements and procedures to be used by the appropriate state or Federal agency to control the environmental impacts of surface coal mining, the surface effects of underground mines, and coal exploration activities. Provisions for mining permits, reclamation plans, performance bonds, and public hearings are also included in Title V. The following sections briefly outline the general and specific provisions of the Act and regulations which provide protection to the environment either parallel to or in addition to USEPA's NEPA responsibilities. The performance standards address many environmental protection issues that would be raised during NEPA reviews. Unless otherwise noted, requirements identified in these sections are applicable to the interim program.

5.2.2.1 Surface and Groundwater Quality and Quantity

Surface and groundwater quality and quantity are protected to varying degrees by stipulations regarding hydrologic balance. Attention must be given to the depth of groundwater, the location of surface drainage channels and streams, and NPDES effluent limitations for iron, manganese, total suspended solids, and pH. Other provisions require the control of runoff and leachate from spoil areas and mandate the casing and sealing of exploration holes and openings. Sediment control structures are required including sedimentation ponds. Dams, embankments, and underground mine discharges are also regulated. The interim regulations also require replacement of legitimate water supplies which have been affected by contamination, diminution, or interruption from surface mining activities.

5.2.2.2 Sensitive Ecosystems

Aquatic and terrestrial ecosystems are provided protection indirectly under surface water quality protection and directly through provisions of

SMCRA which require review by fish and wildlife agencies to ensure that post-mining land uses will protect fish, aquatic, and wildlife habitats. The interim regulations mandate that fish and wildlife habitat and water and vegetation of significant value for wildlife be protected in consultation with appropriate fish and wildlife management agencies (30 CFR 715.17(d)). The interim revegetation requirements stipulate that the permittee must establish on all disturbed land a diverse, effective, and permanent vegetative cover of species native to the area (30 CFR 715.20). The interim and permanent SMCRA programs provide detailed revegetation requirements, including timing of revegetation, mulching, and the use of introduced species.

The interim regulations require the determination of premining and postmining land use capabilities of a proposed permit area. All disturbed areas must be restored to land uses equal to or higher than premining conditions. The KDNREP has opportunity to review and propose revisions to any reclamation plan that does not provide for the avoidance or mitigation of long-term, adverse impacts to the terrestrial ecosystem of a proposed mine site. The permanent regulatory program of OSM earlier required that the permit applicant prepare a fish and wildlife plan. While the interim regulations do provide for the minimization of disturbances and adverse impacts to the aquatic and terrestrial ecosystems, the requirement of a fish and wildlife plan has been suspended.

5.2.2.3. Floodplains

SMCRA sets forth provisons for designating specific areas as unsuitable for mining and the permanent regulations allow the regulatory authority to prohibit mining in areas which affect natural hazard lands including areas subject to frequent flooding. Under both the interim and permanent programs, no land within 100 feet of an intermittent or perennial stream may be disturbed unless authorized by the regulatory authority (30 CFR 816.57 and 715.17(d)(3)). In addition, floodplain configurations must be adequate to safely pass the peak runoff of a 10-year precipitation event for temporary diversions and a 100-year event for permanent diversions. The interim regulations do not, however, specifically protect the 100-year floodplain.

5.2.2.4. Wild or Scenic Rivers

Included among the lands which are explicitly excluded from mining by SMCRA (Section 522) are areas within the boundaries of study rivers or designated rivers of the Wild and Scenic River system. The interim program, however, does not establish specific requirements related to the Wild and Scenic River system other than those applicable to the protection of the hydrologic system (30 CFR 761.11).

5.2.2.5. Wetlands

SMCRA and the interim regulations do not specifically address the protection of wetland areas from mining activities. The interim program establishes protection of wetland areas primarily through water quality control regulations and floodplain buffer zones. Wetland areas also would likely be afforded protection under the general OSM performance standards for protecting fish and wildlife habitat.

5.2.2.6. Endangered Species Habitat

In addition to the protection given by SMCRA to fish and wildlife habitat through the protection of aquatic and terrestrial ecosystems, the Act also requires the operator to report the presence of any critical habitat of a threatened or endangered species or any bald or golden eagle. Under the interim program if a fish or wildlife habitat is to be the primary or secondary post-mining land use, efforts must be made to assure a suitable environment including the use of appropriate replacement vegetation.

5.2.2.7. Significant Agricultural Lands

SMCRA sets forth special performance standards regarding mining on prime farmlands. The provisions of SMCRA are designed to ensure that soil removal, soil stockpiling and replacement, and revegetation and reclamation methods will return a level of agricultural productivity of mined land equal to that which it had before disturbance. Initially, prime farmland included land with suitable resource characteristics that has been used as cropland for at least five of the previous ten years. This definition, however, has been subject to litigation and the regulations are currently being definitized. The interim regulations do, however, establish stipulations on the use of prime farmlands (30 CFR 716.17).

5.2.2.8 Recreational Land Use

The interim SMCRA program does not address protection of recreation areas. The permanent program, however, prohibits new surface mine operations within 300 feet of any public park and stipulates that all new coal mining operations that may affect a public park be approved by the agency with jurisdiction over the park as well as by other relevant agencies. In addition, the program prohibits new coal mining operations within National Parks, National Wildlife Refuges, the National System of Trails, Wilderness Areas, Wild and Scenic Rivers, and National Recreation Areas. National Forests may be excluded from mining activities, although exceptions are allowed upon the affirmative finding by the Secretary of Agriculture that multiple uses of the National Forest would not be impaired by the proposed mining.

5.2.2.9 Noise and Vibration Levels

The regulations of OSM under SMCRA require that noise and vibration from blasting operations be controlled to minimize the danger of adverse effects from airblast and vibration to humans and structures. The interim regulations establish procedures for requesting pre-blast surveys, and establish requirements regarding blasting schedules, limits on airblasts, and explosives rules.

5.2.2.10 Historic, Archaeologic, and Paleontologic Sites

SMCRA stipulates that no new coal mines will be permitted that may affect publicly owned places that are listed on the National Register of Historic Places unless such mining is approved by the State Historic

Preservation Office. In accordance with this stipulation, the Office of Surface Mining (OSM) and the Advisory Council for Historic Preservation (ACHP) have signed a Programmatic Memorandum of Agreement (PMOA) (10 September 1980) which establishes the process for consultation with ACHP in connection with the Secretary of Interior's approval of the State permanent regulatory submissions by OSM. Pursuant to 30 CFR 732.17(c)(1), states with approved programs will be required to amend their programs to meet the requirements of the final permanent program regulations as outlined by PMOA. ACHP will review state programs and OSM will provide ACHP with the opportunity to comment on the proposed state programs pursuant to Section 503(b) of SMCRA. The interim program has not established specific requirements for protecting such resources.

5.2.2.11 Community Integrity and Quality of Life

The interim program has not established regulations specifically designed to protect community integrity but the interim performance standards do mandate that postmining land uses must be compatable with adjacent land uses (30 CFR 716.13). The permanent SMCRA program prohibits new mining operations within 100 feet of a public road right-of-way, except where a mine haul road enters or adjoins the right-of-way. The public has opportunity to comment and ensure that it is adequately protected from the potentially adverse effects of additional traffic and right-of-way acquisition. The program also prohibits mining operations within 300 feet of an occupied dwelling without the owner's consent; within 300 feet of any public, institutional, or community building, church, or school; or within 100 feet of a cemetery.

5.2.2.12 Air Quality

SMCRA provides for the protection of air resources through the control and reduction of fugitive dust emissions from haul roads on the permit area and areas disturbed during mining. The methods which must be used for controlling fugitive dust emissions are to be approved on a site-specific basis for each mine. Site-specific measures will be determined on the basis of applicable Federal and State air quality standards, climate, existing air quality, and size and type of proposed operations. The interim regulations do not establish specific stipulations related to controlling air quality.

5.2.2.13 Geologic and Soil Conditions

A number of provisions of SMCRA provide for the protection of existing geologic and soil characteristics and for the prohibition of mining on potentially hazardous areas. Under the interim program protection of geologic and soil characteristics is provided through provisions relating to topsoil handling, elimination of highwalls, return of the land surface to approximate original contour, subsidence controls for underground mining, woody material disposal restrictions, downslope spoil disposal restrictions, and standards for head-of-hollow and valley fills.

5.3 MSHA's REGULATORY RESPONSIBILITIES

The Coal Mine Health and Safety Act (CMHSA) is Federal legislation intended to improve mine safety. This Act established the Mine Safety and Health Administration (MSHA) as the regulatory authority for ensuring mine safety. The Act also authorized the implementation of regulations requiring approval of mining ground control plans and detailed operational and design standards for underground and surface mines and coal preparation plants.

MSHA is responsible for assigning an identification number by county to all surface and underground coal mines. Although a particular mine operator may have more than one operational mine within a county, only one identification number will be assigned to that operator. Consequently, MSHA numbers will not identify all of the New Source coal mining activity for which USEPA is responsible.

MSHA does not in the course of its requirements issue a permit to mine. Instead, the identification number is used as a means to identify the person responsible for a particular mining operation and as a reference during inspections. Citations for violations and required legal action use this number as a reference also.

5.4 STATE REGULATORY RESPONSIBILITIES

The Commonwealth of Kentucky is actively regulating coal mining activities through their Bureau of Surface Mining Reclamation and Enforcement. Other State agencies also exercise various levels of control over certain mining or mining-related activities. In addition, both USEPA in the NPDES regulations and OSM in the SMCRA provisions have established procedural mechanisms and minimum regulatory standards for transferring program implementation and enforcement responsibilities to the State. Although Kentucky has not yet received approval for either of these functions, the State is pursuing the delegation of both of these regulatory programs.

5.4.1 NPDES Delegation to Kentucky

Section 306(c) of the Clean Water Act (CWA) enables each state to develop and submit to the Regional Administrator a procedure under state law for applying and enforcing standards of performance for New Sources located in each state. If USEPA finds that the procedure and the laws of the state require the application and enforcement of standards of performance to at least the same extent as required by Section 306, the state can be authorized to apply and enforce these standards.

Under current NPDES regulations, the state's program submission must contain the following elements:

- A letter from the Governor requesting program approval;
- A State Attorney General's statement indicating that the state has the legal authority to carry out the program and that the laws designed to implement the program provide adequate authority to do so;

- A Memorandum of Agreement between USEPA and the state including provisions for transfer of pending permit applications, USEPA permit review functions, state reporting requirements, the state enforcement program, joint processing procedures, and USEPA review waivers;
- A complete program description including state permitting procedures, program organization, priorities for permit issuance, priorities for enforcement, funding arrangements, personnel qualifications, and implementation procedures;
- Copies of the state's permit application and permit forms; and
- Copies of all applicable state statutes and regulations.

Upon approval by USEPA, the NPDES program may be delegated to the state subject to the review, reporting, and coordination requirements of the Memorandum of Agreement. More than one State agency may have authority to administer aspects of the NPDES permit program but each relevant agency must have statewide jurisdiction over a class of activities. Proposed USEPA revisions to the NPDES regulations are unlikely to alter these program requirements substantially. Several additional features may be required of the state programs in the future, however, including use of USEPA's standard discharge monitoring report forms, assumption of permitting and enforcement activities for Federal facilities, and implementation of best management practices and pretreatment programs. If the NPDES permit program is delegated to the state, NEPA review requirements are no longer applicable because NPDES permit issuance by a state does not constitute a Federal action.

The current status of Kentucky's efforts to receive delegation of the NPDES program is uncertain. The Kentucky Department for Natural Resources and Environmental Protection (KDNREP) through their Division of Water is negotiating NPDES delegation with USEPA Region IV. Although no timetable for resolution of these problems has been set, it is likely that NPDES delegation will be granted to Kentucky during FY1983. Consequently, no details regarding the regulatory program's timeframe or procedural requirements are currently available. It is expected that SMCRA primacy will be obtained before the NPDES permit program is delegated.

5.4.2. SMCRA Primacy to Kentucky

SMCRA contains provisions for enforcement of the environmental performance standards by the state if the state can demonstrate that it can satisfactorily fulfill this function. In order to obtain primacy from OSM, the state must submit an application to OSM indicating that the state program has a basis in state law and a set of procedures and regulations that are adequate to enforce the Federal standards. The state's proposed laws and regulations must be no less stringent than the Federal model and may be more stringent, but the Kentucky Legislature has declared that Kentucky requirements are to be no more stringent than the minimum Federal standards. OSM after review can either accept and approve the state program or it can adopt and implement its own program for the state. If the OSM program is implemented, the state may submit a new application.

If the state is granted primacy, OSM still exercises certain responsibilities under SMCRA. OSM is to monitor the state's enforcement of the program on a regular basis and will evaluate the state's administration of the program at least annually. Should the state not meet OSM's requirements in carrying out the program, OSM can enforce its own program within the state. OSM also retains regulatory control over coal mining on Federal (and Indian) lands.

In its efforts to obtain primacy, the Kentucky General Assembly passed during the 1980 session House Bill 566 which amended KRS 350 to meet the legal requirements of the State's application to OSM. Kentucky's application package was submitted in March 1980 and the package received "partial approval" in October 1980. Revisions to the program were to be submitted to OSM before approval of the permanent program could be granted. A court injunction, however, postponed OSM's final review. The revised permanent program must be reviewed by OSM to determine compliance with Federal requirements. Delegation of primacy to Kentucky will greatly depend upon delays in this final review process.

5.4.2.1 Permit Application Requirements and Review

Figure 5.4-1 indicates the permit application review process proposed for Kentucky's implementation of the SMCRA program. Applications for permits are required for both exploration and surface mining activities. The application process is initiated by the applicant in one of the Regional Offices of the Kentucky Bureau of Surface Mining Reclamation and Enforcement located in Middlesboro, Hazard, Prestonsburg, Pikeville, London and Grayson. The preliminary application submitted by the applicant includes information pertaining to the following items:

- Location and operation of the mining area;
- Coal seam information;
- Type of disturbance;
- Proposed postmining land use changes;
- Watershed data;
- Surface and underground water monitoring;
- Air quality;
- Fish and wildlife studies; and
- Geologic information.

Upon receipt of the preliminary application, it is assigned an application number.

A preliminary review of the proposed site is conducted by the Regional Office within 21 days of receipt of the preliminary application. Simultaneously, a review is conducted to determine the specific data available and the additional studies which will be required. At this time, a decision will also be made regarding the lands unsuitable review. Upon completion of these reviews, a preliminary review worksheet is prepared and a bond amount assigned. If sufficient information exists to complete a full application and there are no reasons to prevent mining in the proposed permit area, the applicant is advised to proceed with the full application. All of this information is then filed with the Central Office.

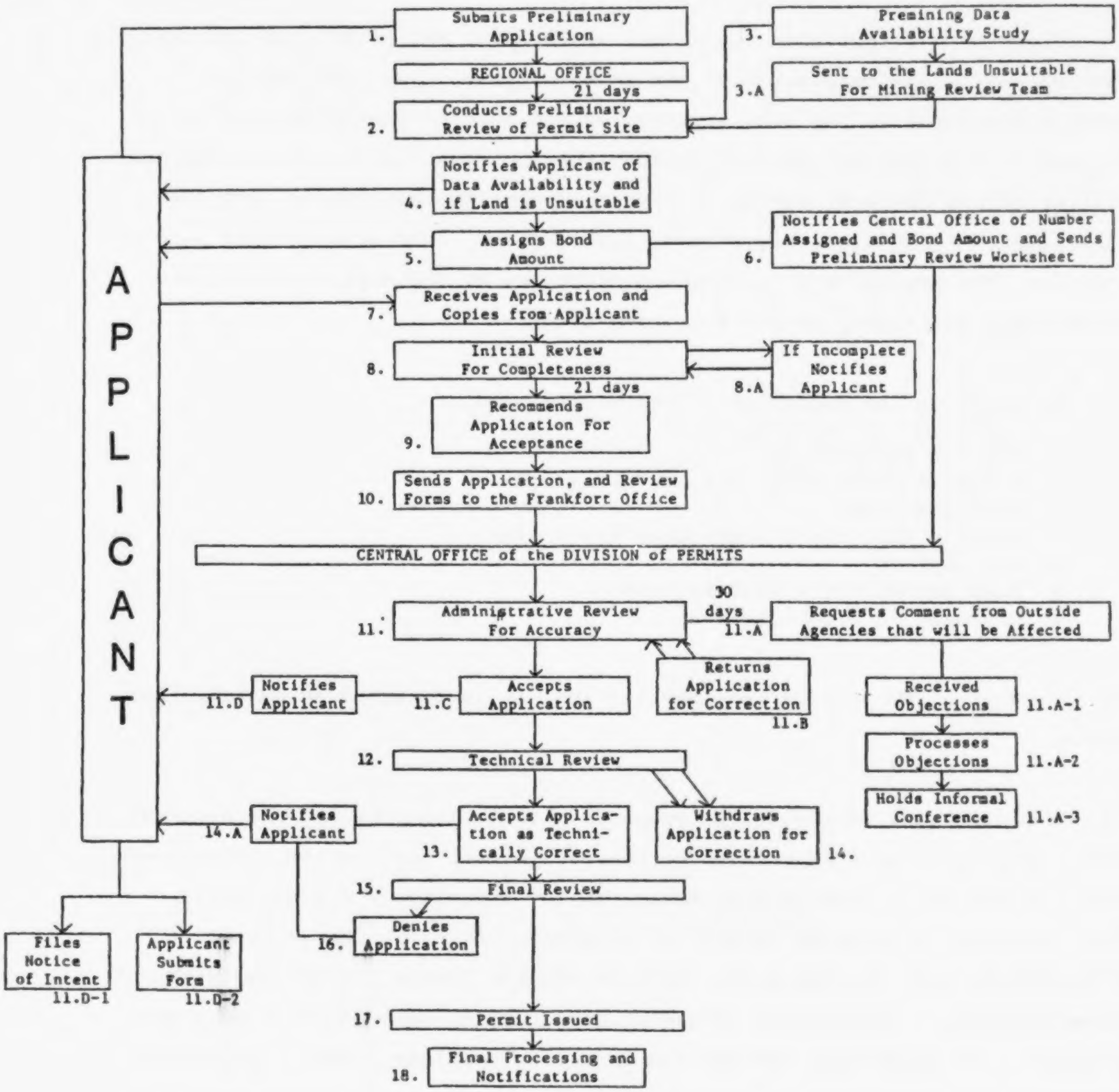

1. Submits Preliminary Application
REGIONAL OFFICE
21 days
2. Conducts Preliminary Review of Permit Site
3. Premining Data Availability Study
3.A Sent to the Lands Unsuitable For Mining Review Team
4. Notifies Applicant of Data Availability and if Land is Unsuitable
5. Assigns Bond Amount
6. Notifies Central Office of Number Assigned and Bond Amount and Sends Preliminary Review Worksheet
7. Receives Application and Copies from Applicant
8. Initial Review For Completeness
8.A If Incomplete Notifies Applicant
21 days
9. Recommends Application For Acceptance
10. Sends Application, and Review Forms to the Frankfort Office
CENTRAL OFFICE of the DIVISION of PERMITS
11. Administrative Review For Accuracy
30 days
11.A Requests Comment from Outside Agencies that will be Affected
11.B Returns Application for Correction
11.C Accepts Application
11.D Notifies Applicant
11.A-1 Received Objections
11.A-2 Processes Objections
11.A-3 Holds Informal Conference
12. Technical Review
13. Accepts Application as Technically Correct
14. Withdraws Application for Correction
14.A Notifies Applicant
15. Final Review
16. Denies Application
17. Permit Issued
18. Final Processing and Notifications
APPLICANT
11.D-1 Files Notice of Intent
11.D-2 Applicant Submits Form

Figure 5.4-1. Application process proposed by the KDNREP for the administration of a permanent regulatory program under SMCRA in Kentucky.

The full permit application is submitted to the Regional Office for administrative review. The basic information requirements are as follows:

- Type of mining and annual coal production;
- Location, watershed, and county of proposed mining activity;
- Acreage to be disturbed by type;
- Cultural or historic areas on site;
- Required variances or special provisions;
- Adjacent land uses including Federal or State parks, US Corps of Engineers flood control reservoir projects, and active deep mines;
- Average slope of permit area;
- Overburden analysis;
- Identification of aquifers, present users and condition, and potential mining effects;
- Identification of surface waters, measured discharges, water quality, and uses;
- Range of diversity indices for fish and macroinvertebrate data at each aquatic sampling station;
- Disturbance of wetland areas or endangered species habitats;
- Premining and postmining land uses; and
- Presence of prime farmland.

When the application is deemed administratively complete, it is forwarded to the Central Office where it undergoes an accuracy review. It is at this point that appropriate Federal, State, and local agencies are notified of the application. These agencies and their areas of concern include:

Local

- City or County Government - public parks;

- Area Development District - historic sites, public parks and buildings;

State

- KDNREP - Division of Hazardous Materials and Waste Management - RCRA compliance;
- KDNREP - Division of Water - CWA compliance, and coal preparation plants, and dam construction;
- Kentucky Department of Transportation - transportation plan;
- Kentucky Heritage Commission - historic sites and places;
- KDNREP - Division of Air Pollution Control - compliance with Clean Air Act;
- KDNREP - Office of Policy and Program Analysis - lands unsuitable for mining determination;
- Kentucky Fish and Wildlife Commission - fish and wildlife plan;
- State Archaeologist - places of archaeological significance;

Federal

- US Forest Service - permit application review within National Forest boundaries;
- US Fish and Wildlife Service - fish and wildlife plan;
- US Army Corps of Engineers - permit application review within Corps watershed;
- US Soil Conservation Service - prime farmland restoration plan; and
- US Environmental Protection Agency - water quality.

Once the permit application has been administratively accepted by the Division of Permit's Frankfort Office and the Administrative Review Section Supervisor has notified each outside agency of the permit filing, each agency is allowed thirty (30) days to make comments (and/or to request further information). Necessary arrangements for each agency's review is subsequently made. The Administrative Review Section Supervisor shall additionally coordinate the date, time, and location of all informal conferences requested by any other Federal, State, or local government agency on a particular mining application.

All public and agency comments are compiled and forwarded to the applicant and the Regional Office from which the application is sent to the Technical Review Section. The technical review consists of a determination that all requirements of the regulatory program are being complied with including a determination of the probable cumulative impacts. At this point, conditions or operating limitations may be appended to the application. This review will result in a final recommendation of: (1) permit denial; (2) permit issuance; or (3) permit withdrawal. A final check on lands unsuitable determinations is also made at this time. This information is then included in the final review along with other considerations such as final checks on the performance bond and notice of intent to mine.

5.4.3 Other State Laws Regulating Coal Mining Activities in Kentucky

Due to the prevalence of coal mining activities in Kentucky, a number of other State laws have been enacted to regulate various aspects of the coal mining industry. Specifically, the relevant statutes and regulations are as follows:

Statutes

KRS 42, KRS 177 - Local Government Economic Assistance Act
KRS 146 - Wild Rivers System; Nature Preserves
KRS 151 - Geology and Water Resources; Floodplains Protection
KRS 224 - Water Pollution Control; Air Pollution Control
KRS 352 - Mining Regulations

Regulations

401 KAR
Chapter 2 - Solid Waste
Chapter 4 - Water Resources
Chapter 5 - Water Quality
Chapter 63 - General Standards of Performance

805 KAR

Chapter 3 - Surface Mining Safety Standards
Chapter 4 - Explosives and Blasting

These laws would be in effect even if the State or Federal SMCRA regulations were overturned or weakened by future litigation. The following sections briefly summarize the level of protection and permits required under these laws.

5.4.3.1 Kentucky Statutes

Under Kentucky Revised Statutes (KRS) Sections 42.330 and 177.960, the State adopted the Local Government Economic Assistance Act which provides an allocation formula for the coal severence tax collected by the Kentucky Department of Revenue on all coal produced in the State. Any funds in excess of $177.6 million are to be divided equally between the State and local governments. Coal-producing counties receive 90% of the local share and coal impact counties (i.e., those counties with no active mines but through which coal is transported) receive 10%. This Assistance Act establishes ten priority areas for these funds, including health, recreation, libraries, social services, government administration, economic development and vocational education.

KRS Chapter 146, the State has been divided into nine soil and water conservation areas. This statute also established the Division of Soil and Water Conservation within KDNREP. Title 146.200 of KRS 146 also established the Wild Rivers System in order to preserve certain designated streams in their free-flowing condition and to prevent future infringement on their beauty caused by impoundments or other man-made works. No mining is allowed within the boundaries of a designated stream including at least the visual horizon from the stream but not more than 2,500 feet from the center of the stream. This boundary also includes access points at the upstream and downstream boundary of the area.

KRS Chapter 151 establishes the Kentucky Geological Survey to aid the State in developing its mineral resources. Title 110 of this chapter sets forth the State's water resources policy: to prohibit pollution; maintain normal streamflow; prevent flooding; regulate construction, operation, and maintenance of dams; prevent obstructions from dumping; and to conserve and properly develop the water resources. Pursuant to this statute, KDNREP's Division of Water requires that a permit application be completed for construction or alterations of dams and for the withdrawal of water. The Division of Water must notify the applicant within 20 working days after receipt of the application whether the permit will be issued. This chapter also establishes State regulations requiring a permit for construction activities in the 100-year floodplains of streams.

KRS Chapter 224 establishes KDNREP as the regulatory authority to implement controls on septic tanks, solid waste disposal, air pollution, and noise. It additionally establishes the State as a member of the Ohio River Valley Sanitation Compact, the Tennessee River Basin Water Pollution Control Compact, the Interstate Compact on Air Pollution, and the Interstate Environmental Compact. These interstate agreements were created to control air and water pollution problems between states with common boundaries. Section 6 of Title 033 of this chapter also gives KDNREP the power to control and regulate strip mining and reclamation in accordance with KRS Chapter 350.

Mining regulations are established under KRS Chapter 352 which includes numerous provisions relating to both surface and underground mining. The regulations are primarily directed to mine safety and health, although some baseline data concerning mine maps, coal bed dip, oil and gas well locations, water pools, hazardous areas, land ownership, property lines, elevations, and contours are required. Additional information and regulations governing mining are contained in KRS Chapter 350 which is part of the State's SMCRA submittal to OSM.

5.4.3.2 Kentucky Regulations

A number of regulations have been enacted to implement the statutes governing coal mining activities in Kentucky. KDNREP is the designated agency in Kentucky responsible for enforcing these regulations. The following information summarizes those regulations applicable to coal mining.

401 KAR 2:010	Solid Waste	Regulations controlling landfills and reporting procedures.
401 KAR 4:010	Water Resources	Requirements and reporting procedures for permits to withdraw water.
401 KAR 4:020	Water Resources	Permit exemption for Dept. of Defense retention structures.
401 KAR 4:030	Dams	Minimum design criteria for dams and associated structures in Kentucky.
401 KAR 4:040	Impoundments	Requirements for certification of plans for embankments greater than 25 feet in height or having an impounding capacity of 50 acre-feet.
401 KAR 5:026	Water Quality	Classification of waters by priority and point source.
401 KAR 5:029	Water Quality	Definition water quality terminology.
401 KAR 5:031	Water Quality Aquatics Wildlife	Water Quality standards for protection of cold and warm water aquatic life.
401 KAR 5:031	Water Quality	Aquatic life 24 hr. pH not <6.0 pH not >9.0 Sets flow and temperature limits. Total Suspended Solids (no specified limits).
401 KAR 5:035	Water Quality	Water treatment requirements for point sources.
401 KAR 63:005	Air Quality	Establishment of primary and secondary air quality standards.
805 KAR 3:010	Mine Safety	Safety standards for coal and clay mines.
805 KAR 3:020	Mine Safety	General safety standards for coal and clay mines.

805 KAR 3:030	Mine Safety & Reclamation	Safety standards and ground control plans.

Table 5.4.-1 summarizes the various Kentucky statutes and regulations in relation to the areas of environmental protection provided by them in regard to coal mining activities.

5.5 LEVEL OF PROTECTION

Under current regulation, environmental resources receive varying levels of protection. Both State and Federal agencies may have the authority to mitigate certain impacts, but the extent of the protection available fluctuates. The following sections summarize previously identified adverse impacts to various resources, the present level of protection afforded each area, and potentially remaining adverse impacts currently not addressed.

Pursuant to Section 502 of SMCRA an initial regulating program has been established until permanent programs are approved in accordance with Sections 502, 503 or 523 of the Act. The initial regulatory program establishes "interim" regulations for coal mining operations until the permanent regulations go into effect. This initial regulatory program includes Parts 715 through 718, 720 through 723, and Part 725 of Volume 30, Code of Federal Regulations. Where differences occur between the interim and permanent program, the permanent regulations are distinguished.

5.5.1 Earth Resources

The construction and operation of coal mines, haul roads, loadout facilities, and coal preparation plants can cause impacts on local earth resources. The major concerns of mining impacts center on steep and unstable slope conditions, toxic overburden, and floodplain conditions.

Table 5.4-1. Environmental resources addressed by Kentucky statutes and regulations related to coal mining activities.

	Wild Rivers System Nature Preserves KRS 146	Geol. & Water Res. KDNREP KRS 151	Water Pollution & Air Pollution Control KDNREP KRS 224	Mine Regs. Safety & Health KDNREP KRS 352	Solid Waste 401 KAR Chapter 2	Water Resources 401 KAR Chapter 4	Water Quality 401 KAR Chapter 5	General Stands. of Perf. 401 KAR Chapter 63	Surface Mining Safety Standards 805 KAR Chapter 3	Explosion and Blasting 805 KAR Chapter 4
Surface & groundwater quality	X	X	X	X	X	X	X			
Sensitive ecosystems	X						X			
Floodplains	X	X								
Wild & scenic rivers	X									
Wetlands	X									
Endangered species habitats	X						X			
Significant agricultural lands										
Recreational land uses	X									
Noise and vibration levels			X							X
Historic archaeologic or paleontologic sites	X									
Community integrity and quality of life			X	X	X				X	
Air quality			X					X		
Geologic and soil characteristics	X	X		X					X	

5.5.1.1 Steep and Unstable Slopes

Mining or related activities that take place on steep or unstable slopes, slopes greater than 20° or lesser slopes that are underlain by bedrock of low bearing strength or other poor geotechnical quality, have a high probability of causing damaging landslides. A number of provisions of SMCRA provide for the protection of existing geologic and soil characteristics and for the prohibition of mining on potentially hazardous areas (30 CFR 701.5; 716.2; 816.102; 816.116; 817.102; 817.116; and 826). The regulatory authority has the power to prohibit mining activities on areas with unstable geologic characteristics.

SMCRA regulations apply special performance standards to mining on slopes of 20° or more (although the regulatory authority may define areas less than 20° as steep slopes based upon soil, climate, or other considerations). These standards apply only to areas where steep slopes are the dominant landform. The SMCRA standards of this section do not apply where mining is done on a flat or gently rolling terrain with an occasional steep slope through which the mining proceeds and leaves a plain or predominantly flat area, or where mining is governed under Section 824 or 716.3 (30 CFR 716.2 and 30 CFR and 8.6.11). Both interim and permanent program performance standards regulate: the placement of spoil materials on downslopes; the elimination of highwalls; the disturbance of land above the highwall; the use of woody material as fill material; and the construction of unprotected drainage channels in backfills (30 CFR 716.2 and 826.12).

State regulations require a permit be obtained for all strip mining activities in the State (405 KAR 1:020). Such a permit may be denied if the underburden is expected to cause unsolvable problems with substantial deposition of sediment in streambeds, or with landslides. State law also requires all land be restored to its original contour with highwalls and spoil banks eliminated (405 KAR 1:230).

5.5.1.2 Toxic Overburden

The disturbance of overburden materials that are toxic or acidic has the potential for causing adverse environmental impacts. Exposure of such strata to water and the atmosphere can result in the formation of acid mine drainage and leaching problems. The lowering of the pH of rainwater and surface runoff can cause toxic substances in the overburden to be carried into the groundwater and surface water systems.

The Surface Mining Act requires coal operators to use the best control technology currently available to treat acid and other toxic mine drainage (Section 515(6)). Discharges from disturbed areas must ordinarily meet effluent standards established by OSM. Drainage from acid-forming and toxic-forming spoil into ground and surface waters is controlled by SMCRA regulations which are designed to protect the hydrologic balance (30 CFR 715.17(g) and 816.48). The regulations vest the regulatory agency (OSM) with the power to judge when certain activities are detrimental to water quality and the surrounding environment (30 CFR 715.17(g) and 816.48).

The Commonwealth of Kentucky establishes similar regulations for toxic overburden through mining regulations administered by the Kentucky Department for Natural Resources and Environmental Protection (405 KAR 1:150). In addition, the Kentucky Environmental Protection Law establishes a general prohibition against the discharge of any substance that shall cause or contribute to the pollution of the waters of the Commonwealth (Section 224.060, KRS).

5.5.1.3 Floodplains

Certain mining activities such as coal preparation plants and loadout facilities may encroach upon floodplains and cause modifications to the hydrologic capacity of the stream and result in the back-up of flood waters upstream. Also, sediment which runs off mined lands reduces the flood carrying capacity of streams. When the same magnitude flood must cover a larger area due to the reduction in water carrying capacity of a stream channel, negative economic and social impacts result from the damages caused by the higher flood waters.

The permanent SMCRA program sets forth provisions for designating areas as unsuitable for mining. Within these provisions, the regulatory authority can prohibit mining areas which affect natural hazard lands including areas subject to frequent flooding. Under the interim program stream buffer zone limits of 100 feet from a perennial stream or a stream with a biological community are established (30 CFR 715.17(d)(3)). The regulations do not, however, specifically protect the 100-year floodplain.

The Kentucky Division of Water of KDNREP requires a permit for the construction, reconstruction, relocation, or improvement of any building dam, embankment, levee, bridge, dike, fill or any obstruction across or along any stream, floodway of any stream, or 100 year floodplain (Section 151.250, KRS).

All permit applications must include a cross-section of the affected streambed. If any building exists within 1000 feet of the proposed obstruction, cross-sections of the floodway at the building must also be submitted indicating the first floor elevation. While the specific criteria for issuing the floodway permit varies with the type of construction proposed, the major stipulation for all activities is the prohibition of any activity which would result in raising the 100 year flood level more than one foot. Certain activities are exempt from floodway permit review, the most significant being the exemption of activities which locate where the watershed area is less than one square mile.

5.5.1.4 Protection of Earth Resources

The SMCRA regulations provide protection for two of the major areas of concern related to impacts on earth resources. Impacts on steep and unstable slopes are subject to the provisions of SMCRA performance standards. Since steep slopes are a dominant landform in the Eastern Kentucky Coal Field, this earth resource is sufficiently protected by SMCRA. Toxic overburden also appears to be adequately regulated by SMCRA provisions. However, OSM does have discretionary power to determine when certain activities are detrimental. Floodplains are protected by the SMCRA requirement of a stream buffer zone of 100 feet. State regulations require a permit for construction in floodplains and prohibit activities which increase the existing flood height more than one foot, increase water velocities by more than one foot, and flood upstream structures beyond the limits.

5.5.2 Water Resources

The mining of coal from surface and underground mines in the Eastern Kentucky Coal Field has resulted in the degradation of surface water and ground water resources of the Coal Field. Mining activities may affect water resources by further degrading the quality of the water and by reducing the quantity of available water supplies.

5.5.2.1 Surface Water

Surface mining and the surface portions of underground mining affect the hydrologic characteristics of an area by reducing peak flood flows and by increasing base flows. The land disturbances associated with mining activities result in the on-site ponding of rain water which would otherwise run naturally into streams. The quality of surface water is affected by mining activities through the introduction of high iron and manganese concentrations, acid mine water, and high sediment loads and concentrations. The erosion of exposed soil, coal refuse piles, and coal storage piles and overflow from sedimentation ponds during storm events results in the release and transport of sediment, toxic substances, and other water quality reducing elements to streams.

Many of the provisions of SMCRA are designed to protect hydrologic balance -- water quality and quantity and the location of surface channels and streams (30 CFR 715.17 and 816.41-816.57). Both interim and permanent program performance standards require that the permittee plan and conduct coal mining and reclamation operations so as to minimize disturbance to the prevailing hydrologic balance and to prevent long-term adverse changes in the hydrologic balance (30 CFR 715.17 and 816.41). The permittee is to emphasize those mining practices which prevent or minimize water pollution and changes in flow over the use of water treatment facilities. Coal mining operators not only face requirements concerning mining methods, but also must initiate monitoring systems to prove they are not adversely affecting the hydrologic balance (30 CFR 715.17(b) and 816.52). Several general methods are established for protecting hydrologic balance such as land shaping, diverting runoff, planting vegetation, regulating channels, mulching, and protecting water from waste.

All surface drainage from disturbed areas that have been graded, seeded, or planted must be maintained until revegetation requirements are met and untreated drainage from disturbed areas complies with applicable water quality standards (30 CFR 715.17(a) and 816.42). Discharge must meet USEPA's NPDES effluent standards. Any legitimate water supplies which are contaminated, diminished, or interrupted must be replaced. The permittee is required to monitor surface water quantity and quality and make regular reports to either the regulatory authority designated under SMCRA or the authority designated under the NPDES permit program (30 CFR 715.17(b) and 816.52).

Where treatment of mine water is necessary, it must continue as long as water quality problems exist. A major feature of SMCRA is the requirement that all surface drainage from the disturbed area pass through a sedimentation pond or series of ponds before leaving the area (30 CFR 715.17(a) and 816.42). Many of the sedimentation pond requirements are being challenged in the courts. SMCRA regulations establish both design and performance standards for sedimentation ponds (30 CFR 715.17(e) and 816.46).

Regulations have also been established regarding the diversion of streams and surface runoff; channel lining, sediment control, and spoil disposal (30 CFR 715.17(c)(g) and 816.44-816.48). The diversion of streams and runoff is required to avoid contamination from disturbed areas and such diversion must be approved by the appropriate regulatory authority. Regulations require that permanent diversion channels be lined. Sediment control measures must incorporate the best technology available to prevent additions of sediment to streams. To avoid contamination and runoff of water from acid or toxic forming spoil, an operator must bury and treat the spoil. Spoil must be buried within 30 days after it is first exposed although temporary storage may be permitted.

The Commonwealth of Kentucky has established minimum criteria necessary to prevent degradation of surface waters by settling solids; floating debris; oil or other nuisance materials; substances producing objectionable odors, taste or turbidity; substances which injure aquatic or human life; and specific types or levels of radionuclides (405 KAR 1:160-170). In addition, standards have been developed for levels of pollutants allowable in discharge mixing zones and for nutrient inputs into impoundments and their tributaries which are subject to eutrophication problems.

5.5.2.2 Groundwater

The major impact of coal mining upon the groundwater resources of the Eastern Kentucky Coal Field is the migration of acid mine drainage into the groundwater. Several mining practices affect the formation of acid mine drainage and its migration into the groundwater. Abandoned deep mines are the major source of acid mine drainage contamination in the region. These mines lie below the water table and provide for the free access of air to the shale and coal seams which contain the iron disulfide minerals. Surface mines which have not been reclaimed or are presently in operation can produce acid mine drainage by the disposal of overburden downslope of a level bench and by the formation of pools of acid mine water. Auger mining consists of horizontally augering the coal seam along a highwall. Exposed auger holes are direct sources of mine drainage emission and can cause subsurface water pollution through surface water inflow (USEPA 1975) and consequent infiltration.

Pursuant to SMCRA regulations, attention must be given to the depth of groundwater resources, the location of surface drainage channels, and the design of sedimentation ponds (30 CFR 715.17(h) and 816.50-816.52). Reclamation must allow water to enter and recharge groundwater levels as it did before mining activities began. The recharge capacity is to be restored to a condition which supports approved postmining land use; minimizes disturbances to the prevailing hydrologic balance; and provides a rate of recharge that approximates the pre-mining recharge rate. The quantity and quality of groundwater resources must be monitored. Such monitoring must routinely assess infiltration rates, subsurface flow, and storage characteristics in a manner approved by the regulatory authority.

The Commonwealth of Kentucky likewise requires the recharge capacity of reclaimed lands to be restored to the premining capacity (405 KAR 1:180). Backfilled materials are to be placed to minimize adverse effects on groundwater flow and quality, to minimize offsite effects, and to support approved postmining land uses. In addition, groundwater levels, infiltration rates, subsurface flow and storage characteristics, and the quality of the groundwater are to be monitored in a manner approved by KDNREP.

5.5.2.3 Protection of Water Resources

Existing regulations provide protection for surface and groundwater resources. However, especially sensitive water resources may not receive the degree of protection necessary to maintain the aspect of the resource which deems it sensitive. Neither State nor SMCRA requirements control upstream discharges which may cause impacts on sensitive surface water segments located downstream. These sensitive water resources are listed in Section 4.2.1.

SMCRA regulations provide a groundwater protection program which requires coal operators to replace any contaminated water supplies. The responsibility rests with the well owner to prove contamination. In certain cases, individuals may not know their water is contaminated or may have to use the contaminated water until an alternative supply can be made available. However, the regulations are not designed to consider future impacts on off-site wells prior to the commencement of mining activities. Consideration of the impacts on specific off-site wells could prevent future contamination and reduce the need for replacing such sources of water.

Further, SMCRA regulations do not provide for any protection of groundwater resources which may be needed at some future date.

5.5.3 Biological Resources

The construction and operation of coal mines, haul roads, and preparation plants can cause severe impacts on the biological resources of the Eastern Kentucky Coal Field. Direct effects may include elimination of terrestrial vegetative and wildlife habitats on mine sites (especially significant for strip mines) and elimination of aquatic life in receiving streams due to stream removal, increased sedimentation, or changes in water chemistry. Mining activities may also cause direct effects by producing changes in the hydrologic regime in the receiving streams.

5.5.3.1 Elimination of Terrestrial Habitats

Terrestrial habitats in the Coal Field may be affected by both underground and surface mining operations. Underground mining may result in the direct elimination or disturbance of terrestrial vegetation at the mine mouth and along haul roads. This affects both plant and animal communities. Underground mining can also cause subsidence or changes in groundwater levels which may alter growth patterns and species composition of terrestrial vegetation. Surface mining may affect terrestrial communities by direct removal of vegetation or by alteration of the substrate. Coal removal alone is seldom the most important impact of surface mining, however, unless rare or endangered species are eliminated. More significant disturbances result from soil modification caused by overburden removal.

5.5.3.2 Elimination of Aquatic Habitats

The major issues with respect to the possible effects of mining on aquatic habitats in the Eastern Kentucky Coal Field are: (1) direct elimination of additional wetlands, streams segments, and associated impacts; (2) disturbance of receiving streams, rivers, and wetlands by increased acid-mine drainage and sedimentation in an area already significantly affected by previous mining activities; (3) potential impacts on remaining sensitive aquatic and wetland habitats; and (4) effectiveness of reclamation efforts in reducing or minimizing impacts on aquatic and wetland habitats. Surface mining activities in particular may result in the direct removal of stream segments and wetlands. Both streams and wetlands may also be significantly affected by acid runoff, fertilizers, lime, and sedimentation from the mined areas during reclamation activities. Potential impacts primarily include changes in groundwater inflow and soil moisture levels, both of which may result in direct impacts on wetland vegetation or changes in species composition. Aquatic habitats and wetlands may already be significantly affected by acid mine drainage and sedimentation caused by post-mining activities. Sedimentation generally has the more significant potential impact on aquatic life due to increased erosion from mined areas and coal washing facilities (Haynes et al. 1979).

5.5.3.3 Increased Sedimentation

Sedimentation may cause increased scouring in streams, shading of benthic plants, direct smothering of benthic invertebrates, or creation of unstable substrates unsuitable for animal colonization (Hart and Fuller 1974). The loss of benthic plants and animals typically results in elimination of fish from affected areas (Haynes 1970). Sedimentation may also directly affect fish by clogging gills, causing osmotic stress, smothering eggs deposited in the substrate, reducing disease resistance, or changing migratory patterns (Dvorak et al. 1977).

Aquatic and terrestrial ecosystems are provided protection indirectly under SMCRA via surface water quality protection and directly through SMCRA regulations which provide for review by fish and wildlife agencies to ensure that post-mining land uses will protect fish, aquatic, and wildlife habitats. The revegetation requirements provide protection to terrestrial ecosystems by requiring equal or higher value land uses after reclamation and standards for success of revegetation (30 CFR 715.20 and 816.111-816.117). If a fish and wildlife habitat is to be a primary or secondary post-mining land use, additional efforts must be made to assure a suitable environment. Extra care must be taken to select appropriate vegetation to replace that removed for mining. If post-mining land uses are for cropland or residential land, areas must be left that can support wildlife.

The Commonwealth of Kentucky requires that coal mining operators must establish on all land that has been disturbed, a diverse, effective, and permanent vegetative cover of species native to the area. State regulations also require mining operations to be conducted in such a way as to minimize disturbance of the hydrologic balance on which fish and wildlife depend.

5.5.3.4 Protection of Biological Resources

Existing regulations protecting biological resources relate only to direct, on-site impacts. Very few provisions have been established requiring the consideration of impacts to resources outside the permit area. SMCRA regulations stipulate that reclamation of the site must offer the same or better protection to terrestrial ecosystems as existed before the mining operations. Yet surrounding biological habitats and potential impacts are not considered. The protection of sensitive biological areas that would be significantly adversely impacted if mined is provided by SMCRA only through the permanent program designation of lands unsuitable for mining (30 CFR 762 through 769). No such designation exists for the interim program.

5.5.4 Land Resources

The continued extraction of coal resources from the Eastern Kentucky Coal Field will create adverse impacts on the land resources of the Coal Field. Two major impacts will occur as a result of coal resource extraction and the associated activities: (1) the conversion of Environmentally Significant Agricultural (ESA) land to non-farming use; and (2) the conversion of recreational land resources to other uses and the degradation of the environment adjacent to the recreational facility.

5.5.4.1 Environmentally Significant Agricultural Lands

The cumulative effect of continued coal production and increasing population levels in the Eastern Kentucky Coal Field will result in the conversion of ESA land to urban and mining-related uses. The conversion of ESA land in the Eastern Kentucky Coal Field is considered a significant adverse impact because of the relative scarcity and high economic value of this land resource in the Coal Field. The further reduction of this farmland in eastern Kentucky would further diminish the nation's cropland acreage. Agricultural land reduces runoff by absorbing precipitation, aids in replenishing groundwater supplies buffers environmentally sensitive areas from encroaching development, and can serve in the land treatment of wastewater discharge.

Sections 507(b)(16) and 515(b)(7) of SMCRA authorize special performance standards regarding mining on prime farmlands. Under an earlier OSM definition, prime farmland is land with suitable resource characteristics (as determined by the Soil Conservation Service) that also has been used as cropland for at least five of the ten years before acquisition for mining purposes. While this definition is under contention, the SMCRA performance standards are designed to ensure that soil removal, soil stockpiling and replacement, and revegetation and reclamation methods will return a level of agricultural capacity of mined land equal to that which it had before disturbance (30 CFR 716.7 and 823).

As with SMCRA requirements, Kentucky law mandates that an applicant must submit to KDNREP a plan for restoration of any prime farmland within permit boundaries (405 KAR 1:250). The applicant must convince the department that the prime farmland will be restored to equivalent or higher levels of yield as unmined prime farmland in the surrounding area. All soil horizons to be used in the reconstruction of the soil must be removed before drilling, blasting, or mining of such lands (405 KAR 1:250).

5.5.4.2 Recreational Resources

Recreational land resources are not only threatened by the conversion to mining or other uses, but by the pollutants emitted by mining activities.

These pollutants include noise, dust, degraded water, and the visual effects of mining operations when viewed from recreational land. The recreational land resources of the Eastern Kentucky Coal Field are important regional resources that require protection from the direct and indirect effects of mining activities in order to preserve future recreational opportunities for the region's population.

Interim SMCRA regulations do not address protection of public parks. The permanent program does prohibit new surface mine operations within 300 feet of any public park or on any lands which will adversely affect any publicly owned park. In addition, the permanent program prohibits new coal mining operations on any lands within National Parks, National Wildlife Refuges, the National System of Trails, Wilderness Areas, Wild and Scenic Rivers, and National Recreation Areas. National Forests also may be excluded from mining activities, although exceptions to such exclusions are allowed upon the affirmative finding by the Secretary of Interior that multiple uses of the National Forest would not be impaired by the proposed mining. The public notice provisions of SMCRA provide opportunity for owners of private recreational facilities to comment on coal mine permit applications that may affect the operations of such facilities.

State protection of recreational lands is provided under Kentucky Revised Statute (KRS) Chapter 146 which established a Statewide system of Nature Preserves and Wild Rivers. An inventory of these and other areas of recreational value including camping grounds, scenic overlooks, and recreational streams is maintained by the Kentucky Nature Preserves Commission (KNPC).

5.5.4.3 Protection of Land Resources

The protection of land resources is rather limited. Under both interim and permanent SMCRA regulations, stipulations are established only for those lands classified as "prime farmland" and used previously as cropland. Lands classified as unique farmland, farmland of statewide importance, farmland of local importance, farmland in or contiguous to Environmentally Sensitive

Areas, farmland of waste utilization importance, or farmland with significant capital investments in Best Management Practices are not considered for protection by SMCRA or the State.

Under the permanent program surface mining operations are prohibited within 300 feet of any public park and restricted on any lands which may adversely affect public parks. This SMCRA park restriction includes any area designated by a Federal, State or local agency for public recreational use including any land leased, reserved, or held open to the public for recreational use. Surface mining activities on lands beyond 300 feet and affecting public parks may be subject to joint review by the mining regulatory agency and the agency with jurisdiction over the park. Such restrictions are not applicable, however, to the interim program.

5.5.5 Human Resources

Coal mining and associated activities in the Eastern Kentucky Coal Field will have both beneficial and adverse impacts on human resources and transportation. These impacts occur in the form of economic effects, rapid population growth, increased demand in public and private services, and transportation impacts.

5.5.5.1 Economic Impacts

The economic effects of coal resource development in eastern Kentucky are expected to be beneficial to the economic well-being of the region. However, as coal mining becomes more extensive and provides more employment opportunities the economic base of the area will become more dependent upon this single industry. Fluctuations in the coal industry will result in major fluctuations in the area's economy.

5.5.5.2 Population Growth

The most significant adverse effects of coal resource development on human resources are caused by rapid population growth. Rapid population growth occurs in response to the sudden creation of jobs in an area that does not have a local labor force of sufficient size and/or skill to fill the available positions. When this happens non-local workers and their families are attracted to the area because of the employment opportunities made available to them. These new residents require adequate levels of basic community services and facilities.

5.5.5.3 Increased Demand for Public and Private Services

As population grows, so does the demand for basic community services and facilities (infrastructure) such as housing, wastewater treatment, water, health care, education, transportation network, fire and police protection, and recreational facilities. In most instances, the existing tax base of the community cannot supply these services and facilities to the new residents on such a short notice. Because of the lag in the receipt of tax revenues from the new residents and the long lead times and high costs of required public improvement projects, serious strains on existing infrastructure elements occur. The provision of housing for the new residents of an area may lag several years behind the need because of the lack of adequate public infrastructure (roads, sewers, water, etc.), the unavailability of construction and/or mortgage credit, or the inability to assemble land needed for new housing developments.

5.5.5.4 Impacts on Transportation

Local transportation networks, primarily the road system, can also be adversely affected by mining activities and mining-induced population growth. Public safety and congestion problems on local roads can occur as a result of the larger volumes of private vehicles using the roadways, the larger number of commercial vehicles (primarily coal haul trucks) using public roadways, and increases in coal-related rail traffic which cause a higher probability of rail-highway crossing accidents and delays. The larger volume of coal haul trucks using public roadways may also degrade the quality of road surface.

Under the interim SMCRA program all applicants must submit a transportation plan approved by the State Department of Transportation (DOT) with the mining application. The State DOT classifies proposed routes regarding weight limits and provides information regarding the existence of any substandard bridges intended for use. The permanent SMCRA program prohibits new mining operations within 100 feet of a public road right-of-way, except where a mine haul road enters or adjoins the right-of-way. The permanent program also prohibits mining operations within 300 feet of an occupied dwelling without the owner's consent; within 300 feet of any public, institutional, or community building, church, or school; or within 100 feet of a cemetery (Section 522(3)(5)). The general performance standards also set forth requirements for mining roads and require that post-mining land use be compatible with adjacent land use policies and plans.

5.5.5.5 Protection of Human Resources

SMCRA regulations incorporate very little consideration of impacts to human resources. There are no provisions mandating the mitigation of possible adverse effects to the economy of the area, any induced population growth, or public and private service infrastructure. SMCRA regulations do not consider the public safety aspects of using public roadways for coal haul routes.

The State has provided some mitigation for socioeconomic impacts. An access permit must be obtained for haul roads or entrances to proposed mining facilities which intersect State routes. The State Department of Transportation performs on-site reviews of proposed plans and the plans must be approved prior to issuance of the access permit. Kentucky's Local Government Economic Assistance Act also provides a means for allocating revenues from coal severance taxes among the local governments. The Act establishes priority areas for these funds and impacts on local communities in coal producing areas seemed to be lessened somewhat by this economic assistance.

5.5.6 Cultural Resources

Coal mining activities in the Eastern Kentucky Coal Field will result in primary and secondary impacts on the cultural resources of the area. These resources may include archaeological or historic sites, properties, structures, or objects that are listed on or determined eligible for the National Register of Historic Places. Primary impacts on cultural resources are those beneficial or adverse effects that would result from construction or operation of coal mines or related facilities. The beneficial effects of coal mining or preparation activities are those which improve the aesthetic setting of historic structures or enhance the surrounding landscape.

Historic and archaeological resources are highly susceptible to damage by the mining of coal, particularly by surface mining that entails an extensive modification of large surface areas. The interim SMCRA program does not address historic and archaeological resources but the permanent program of SMCRA provides that no new coal mines will be permitted that may affect publicly owned places that are listed on the National Register of Historic Places unless such mining is approved by the State Historic Preservation Office. The regulatory authority's discretionary power to prohibit mining on certain lands incorporated in the permanent program includes those areas where mining may affect historic lands of cultural, historic, scientific, or aesthetic value. Sites eligible for the National Register are not presently protected under SMCRA.

Pursuant to KRS 171.381, the Kentucky Heritage Commission is charged with protecting and developing the historic resources of the State. The Commission encourages, promotes, and advises State, local, and Federal government agencies concerning means of achieving these two goals. The procedures of the Commission require that relevant agencies consult with the State Historic Preservation Officer (SHPO) to identify historical, structural, and archaeological sites in the project area and consider these resources in project planning.

5.5.6.1 Protection of Cultural Resources

Existing regulations require the identification of known historical, cultural, or archaeological resources and prohibit surface mining activities which adversely affect places on the National Register. These regulations are established only in the permanent program, however, and apply solely to resources already identified and listed on the National Register (30 CFR 761.11(c)). What is not required is the consideration of resources which may be eligible for listing. If the resource has not already been identified, it probably will not be addressed under SMCRA regulation. Because very little cultural resource survey work has been performed in eastern Kentucky, many undiscovered resources could be destroyed by coal mining activities.

5.5.7 Air Quality and Noise

5.5.7.1 Impacts on Air Quality

Coal mining and associated activities in the Eastern Kentucky Coal Field may result in significant amounts of fugitive dust emissions. Other pollutants may be emitted in the air as a result of these operations, but in insignificant amounts. Fugitive dust emissions are generated primarily by trucks on haul roads. Other sources include surface mining, blasting, preparation, coal loading and unloading, and by wind erosion. The transportation of coal by truck on unpaved public and private haul roads is the major contributor of fugitive dust emissions from coal-related activities in eastern Kentucky.

The interim regulatory program does not establish specific air protection regulations. Permanent SMCRA regulations provide for the protection of air resources through the control and reduction of fugitive dust emissions from on-site haul roads and areas disturbed during mining (30 CFR 816.95). Methods are established in the SMCRA regulations for controlling and reducing fugitive dust (30 CFR 816.95 (b)). The methods generally include watering, chemical treatment or paving of roads, revegetation, watering haul trucks, and using conveyor systems. The methods which must be used for controlling fugitive dust emissions are to be approved on a site-specific basis for each mine. Site-specific measures will be determined on the basis of applicable Federal and State air quality standards, climate, existing air quality, and size and type of proposed operations. The regulations do not consider pollutants other than fugitive dust, but SMCRA does require compliance with all other applicable air quality laws. However, 30 CFR 816.95 was suspended 4 August 1980 (45 FR 51548) pending the final determination of a US District Court ruling in May 1980 that barred OSM from regulating air dusts other than those caused by wind erosion. The specific fugitive dust control measures identified in 30 CFR 816.95(b) have currently been dropped.

Kentucky air pollution control regulations establish standards and control measures for atmospheric emissions (401 KAR 50-65). Fugitive emissions are addressed in 401 KAR 63:010 requiring that reasonable precautions should be taken to prevent particulate matter from becoming airborne. Methods suggested to prevent such emissions include the application of certain substances (e.g., water, oil, chemicals) on surfaces creating dusts; the installation of dust-reduction equipment; the use of covers for transportation vehicles; and the maintenance of paved roadways. Since the Federal SMCRA regulations for air resources protection are currently suspended, State air pollution control regulations provide the primary means of presently controlling air emissions associated with surface mining operations.

5.5.7.2 Noise Impacts

The noise impacts from coal haul trucks may be a significant adverse impact in eastern Kentucky because of the typically close proximity of sensitive receptors to the haul routes and the large geographical area that the land roads affect. The noise effects of these coal mining operations are geographically small, affecting only receptors immediately adjacent to the mining site. Only mines which are extremely close to each other result in cumulative or synergistic noise impacts. However, as the number of mines increase in eastern Kentucky, the total area of noise impacts will grow. It logically follows that the total number of affected receptors will also increase.

The regulations of OSM under SMCRA require that noise and vibration from blasting operations be controlled to minimize the danger of adverse effects from airblast and vibration to humans and structures. The Act authorizes pre-blast surveys, blasting schedules, limits on airblasts, and explosives rules.

Kentucky law requires that a blasting plan be approved by KDNREP prior to being conducted and also authorizes pre-blasting surveys, blasting schedules, and requirements on blasting procedures (405 KAR 1:090).

5.5.7.3 Protection of Air Quality and the Acoustic Environment

Since OSM's authority to protect air resources is currently in question, Kentucky regulations provide the primary source of control over emissions caused by surface mining activities. State mining regulations, however, do not establish specific provisions controlling air emissions. The basic protection is provided by State air quality regulations. While the State air quality law provides authority to review off-site as well as on-site impacts, the State air quality protection agency limits its review of surface mining operations primarily to cleaning and processing operations.

The permanent SMCRA regulations for fugitive dust emissions are restricted solely to on-site activities. Fugitive dust regulations primarily restrict the emissions from on-site haul roads. SMCRA stipulations do not regulate fugitive dust emissions on off-site public roads which are used as haul roads. Violations of primary ambient air quality standards can occur at sensitive receptors.

The regulation of noise from mining operations is limited to blasting activities. Neither State nor SMCRA regulations require protection of the acoustic environment from other mining operations, in particular noise emissions associated with coal haul trucks on public and private roads.

5.5.8 Summary

The impacts of coal mining activities in eastern Kentucky that are controlled or otherwise mitigated by Federal or State regulations as well as those impacts that remain unmitigated have been presented in Section 5.5. Table 5.5-1. presents a summary of the unmitigated impacts of coal mining activities by resource category.

5.6 REGULATORY INTERRELATIONSHIPS

As the preceding sections have indicated, USEPA, OSM, MSHA, and several State agencies exercise various levels of control and regulation over the coal mining industry. In a number of environmental resource areas, the control exercised by these various agencies overlaps or intersects with each agency generally operating under a different timeframe. Additionally, the implementation of SMCRA in particular is still in its preliminary stages. The precise nature of its procedural requirements is unlikely to be clear until a flurry of litigation has been concluded. Consequently, the development of an effective and efficient NEPA compliance strategy for USEPA Region IV requires an understanding of these regulatory interrelationships as well as the timeframe and level of control exercised by each agency.

5.6.1 Delegation of Authority to the State

The uncertain status of the delegation of both NPDES and SMCRA regulatory authority to Kentucky complicates the development and implementation of NEPA compliance strategies for USEPA. As discussed in Sections 5.4.1. and 5.4.2., the environmental review responsibilities of both OSM and USEPA will be diminished when their respective permitting programs are delegated to the State. In addition (as addressed in Section 5.6.2.), any Memorandum of Understanding between OSM and USEPA which sets forth certain responsibilities and procedures for both agencies is greatly affected by the delegation or retention of permitting responsibilities. Consequently, the requirements, timing, coordination, and implementation of a USEPA NEPA compliance strategy will be significantly influenced by the possible delegation of permitting responsibilities to Kentucky.

Table 5.5-1. Summary of coal mining impacts by resource for the Eastern Kentucky Coal Field that are not regulated by State or Federal laws.

WATER RESOURCES	
Surface Water	Surface disturbances can adversely affect the water quality of sensitive stream segments possibly causing a reduction, alteration in composition, or elimination of aquatic life and reduction in water use opportunities for domestic consumption or industrial processes.
Groundwater	Contamination of aquifers by acid mine drainage from underground mines or migration of leachates from coal refuse and storage piles at coal preparation plants and dewatering of underground mines can adversely affect the quality and quantity of water at public and private water supply wells.
BIOLOGICAL RESOURCES	
Terrestrial Ecosystems (including threatened or endangered species)	Mining can cause elimination or disturbance of identified sensitive plant and animal habitats, and identified sensitive areas.
Aquatic Ecosystems (including threatened or endangered species)	Mining can cause the elimination or disturbance of identified sensitive aquatic habitats and identified sensitive areas by changing the water quality characteristics of streams.
WETLANDS	Surface mining can result in the direct removal or elimination of wetlands during land clearing operations. The introduction of acid mine drainage and sedimentation into wetland areas, changes in groundwater and surface water flows, and alteration of soil moisture levels may result in the degradation of wetlands.
LAND RESOURCES	
Environmentally Significant Agricultural (ESA) Lands	Mining can result in the conversion of prime farmland cultivated at least five of the past ten years, unique farmland, and farmland of statewide or local importance to non-agricultural uses, reducing an already scarce resource in eastern Kentucky.
Recreation Lands	Mining can result in the pollution of recreational lands adjacent to mining operations by noise, degraded water, dust, and/or visual effects.

Table 5.5-1. Summary of coal mining impacts by resource for the Eastern Kentucky Coal Field that are not regulated by State or Federal laws (concluded).

CULTURAL RESOURCES	
Historic/Archaeological Sites	Under the interim program mining operations can alter, destroy, or otherwise affect sites that are listed on or are eligible for inclusion on the National Register. When the permanent SMCRA regulations become effective, those sites that are eligible for inclusion but not listed, will remain unprotected. Limited survey work in eastern Kentucky increases the potential for impacting such eligible sites.
AIR QUALITY AND NOISE	
Air Quality	Coal transportation by haul trucks on unpaved public and private roads not within the permit area can result in fugitive dust emissions at sensitive receptors, affecting public health and general welfare.
Noise	Mining operations and coal transportation on public and private haul roads can increase ambient noise levels significantly at sensitive receptors located near the operations or along roads with high volumes of coal truck traffic, affecting public health and general welfare.

Four different regulatory scenarios could result depending on the specific role of the State, OSM, and USEPA in the permitting processes. Due to the uncertain status of each agency's future role, the NEPA Compliance Strategies developed for USEPA must be able to accommodate the constraints set forth by any of these regulatory scenarios. These strategies must consider the following possible situations:

- State receives OSM primacy and also NPDES delegation. Under such a situation all regulatory power would lie with the State and USEPA would have only NPDES permit review authority with no NEPA mandate.

- State receives OSM primacy and yet USEPA retains authority over NPDES permit program. USEPA would retain authority to issue NPDES permits thus subjecting NPDES permit applicants to NEPA requirements. Efforts to coordinate NPDES permit issuance with mining regulation would have to be established between the State and USEPA.

- State receives delegation of the NPDES program but does not receive OSM primacy. Federal mining regulations would continue to be enforced by OSM yet NPDES permits would be issued by the State and such action would no longer require NEPA compliance.

- State receives no delegation of authority. USEPA would continue to issue NPDES permits, subject to NEPA requirements, while OSM would retain authority over enforcement of the Federal mining program.

5.6.2 Overlapping Jurisdiction and Level of Protection

Both the interim and permanent SMCRA program regulations of OSM have been challenged in the courts and further legal action is expected. To date the courts have largely upheld the major provisions and constitutionality of SMCRA, but OSM has initiated several changes in the permanent program. Further modifications are expected from OSM as it prepares for other legal challenges. USEPA, while attempting to minimize duplication with OSM, nevertheless must be prepared to administer independently its strategy for NEPA compliance when reviewing NPDES New Source permits for coal mining operations.

The development and implementation of a NEPA compliance strategy for USEPA is further complicated by the various other State agencies involved in the regulation of coal mining activities. Under many of the proposed strategies, USEPA may be able to use some of the information required by these agencies and merely piggyback their regulatory efforts if the level of protection provided is sufficient. However, duplicative regulatory requirements could reduce the effectiveness of some or all of these agencies and their coal mining regulatory programs.

Table 5.6-1 indicates the areas of regulatory responsibility for each agency, the authorizing legislation, and the level of protection afforded to each environmental resource. It is apparent from the table that USEPA could piggyback many of their regulatory responsibilities with those of other State and/or Federal agencies and still achieve the same or greater level of protection as is currently afforded under NEPA.

5.6.3 Temporal Relationships Between Regulatory Programs

Each of the coal mining regulatory programs operates independent of the other programs. No procedures have been established between the State and Federal agencies involved in coal mining regulation. The various timeframes that each program operates on complicates the potential for sharing information and piggybacking regulatory responsibilities.

USEPA's permit review process operates on a somewhat indefinite timeframe which varies with the ultimate level of review a particular NPDES permit application must go through. As indicated in Figure 5.1-1, this review can be completed and a permit issued in a minimum of 165 days to as much as 650 days. Through the implementation of a NEPA compliance strategy, it is expected that these timeframes can be shortened significantly through the use of information from other regulatory agencies, piggybacking of regulatory responsibilities, and subareawide or areawide environmental review.

Table 5.6-1. Summary of environmentally protective laws and identification of best protection available exclusive of USEPA NEPA compliance program.

RESOURCE	OSM	EPA	Kentucky		Most Restrictive Agency	
	Legislative Authority	Legislative Authority	Agency	Legislative Authority	Agency	Protection
Surface and Ground-water Quality	SMCRA Sec. 515(b)(10) 515(b)(24) 519(c)(2) 519(c)(3)	CWA Safe Drinking Water Act	KDNREP	KRS 352 KRS 146 KRS 151 KRS 224 401 KAR 2,4,5	KDNREP	classification of stream segments and non-degradation clauses.
						certification of improvements having capacity of 50 acre feet or more
						surface water withdrawal permits
					USEPA	NPDES permitting system SDWA protects ground-water supplies
Aquatic Ecosystems	SMCRA Sec. 515(b)(10)(B) 515(b)(24) 519(c)(2) 519(c)(3)	Fish and Wildlife Coordination Act of 1958	KDNC	KRS 146 401 KAR 5	KDNREP	standards for protection of warm and cold water aquatic life
					OSM	BAT required to minimize effects on wildlife
						requires Fish and Wildlife Plan, USFWS Coordination
Floodplains	SMCRA Sec. 522(a)(3)(D) 522(b)(10)	EO 11988 Fish and Wildlife Coordination Act of 1958	KDNREP	KRS 146 KRS 151	OSM	mining prohibited within 100 ft. of permanent streams
					USEPA	EO 11988 protection of undeveloped floodplains
Wild and Scenic Rivers	SMCRA Sec. 522(e)	Wild and Scenic Rivers Act	KDNREP	KRS 146	KDNREP	Act protect stream designated Wild River System protects stream and buffer of visual horizon or 2500 feet
					USEPA	W&SRA protects streams from development

Table 5.6-1. Summary of environmentally protective laws (continued).

RESOURCE	OSM	EPA	Kentucky		Most Restrict Agency	
	Legislative Authority	Legislative Authority	Agency	Legislative Authority	Agency	Protection
Wetlands	SMCRA Sec. 522(a)(3) (implied)	EO 11990 CWA Sec. 404	KDNREP	KRS 146	USEPA	EO 11990 protects wetlands by review process. Wild and Scenic Rivers Act protects wetlands along streams
					KDNREP	designated Wild River System protects stream and buffer of visual horizon or 2500 feet
Endangered Species Habitat	SMCRA Sec. 515	Endangered Species Act of 1973 Sec. 7	KNDC	KRS 146	USFWS	Endangered Species Act
Terrestrial Ecosystems Lands	SMCRA Sec. 508(a) 515		N/A	N/A	SMCRA	BAT required to minimize effects on wildlife
						requires Fish and Wildlife Plan, USFWS coordination
						prohibits mining in public parks
Significant Agricultural Lands	SMCRA Sec. 507(b)(16) 515(b)(7)	Environmentally Significant Agricultural Lands Policy Memo (USEPA)	N/A	N/A	OSM	special performance standards for mining on prime farmlands
					USEPA	environmentally significant agricultural lands protected
Recreational Land Use	SMCRA Sec. 522(e)(1) 522(e)(2) 522(e)(3) 522(e)(5)	Wilderness Act of 1964 Wild and Scenic Rivers Act of 1976 Endangered Species Act of 1973	KNPC KDNREP	KRS 146	OSM	prohibition of mining in public parks mandated by Congress
					KNPC	Kentucky Nature Preserves classification
Noise and Vibration Levels	SMCRA Sec. 515(b)(15)		KDNREP	KRS 224 805 KAR 4	OSM	maximum airblast levels defined for sensitive receptors
Historic, Archaeologic and Paleontologic Sites	SMCRA SEC. 522(e)(3)	EO 11593 National Historic Preservation Act of 1966 Archaeological and Historic Preservation Act of 1974	KNPC	KRS 146	OSM	prohibition of mining within 300 feet of Federally listed places, except with approval of SHPO

Table 5.6-1. Summary of environmentally protective laws (concluded).

RESOURCE	OSM	EPA	Kentucky		Most Restrictive Agency	
	Legislative Authority	Legislative Authority	Agency	Legislative Authority	Agency	Protection
Community Integrity and Quality of Life	SMCRA Sec. 522(e)(4) 522(e)(5)		KDNREP	KRS 224 KRS 352 401 KAR 2 803 KAR 3	OSM	requires publication of intent to mine lands unsuitable program prohibits mining within specified ranges of houses, roads, hospitals, cemetaries, churches, pipelines and other public and private facilities
Air Quality	SMCRA Sec. 515(b)(4)	Clean Air Act	KDNREP	KRS 224 401 KAR 63	OSM	fugitive dust control on permit area
					KDNREP	CAA regulation of processing plants
Geology and Soils	SMCRA Sec. 510(d) 515(b)(2)-(7) 515(b)(25) 522(a)(3)(D)		KDNREP KGS	KRS 146 KRS 151 KRS 352 805 KAR	OSM	performance standards and special performance standards for sediment control, steep slopes, etc.

In addition to specific legislation, USEPA has the congressionally mandated NEPA responsibility for environmental considerations associated with facilities requiring (CWA) New Source coal mining NPDES permits. This responsibility thrusts USEPA into a review capacity for all aspects of environmental effects.

6.0 ALTERNATIVES INCLUDING THE SELECTED ACTION

During the process of developing a suitable strategy for compliance with NEPA in the review of New Source coal mining NPDES applications for eastern Kentucky, a total of 29 possible compliance alternatives were developed and evaluated by USEPA. All reasonable compliance alternatives were considered through consultation with a Review Committee established as part of the study. In order to be considered feasible, a compliance alternative had to be thorough in its treatment of environmental effects such that USEPA compliance with the provisions of NEPA was assured. The compliance alternative also had to result in a streamlining of the review process such that the NPDES permit action would not result in substantial delays in the opening of New Source coal mines. Finally, the compliance alternatives which were carried through their initial screening had to be technically feasible such that they were implementable with a reasonable degree of ease. Four general compliance alternatives evolved from the initial screening process.

This chapter describes the current NEPA compliance procedures utilized by USEPA, the concept of Resource Threshold Criteria, the four general compliance alternatives that resulted from initial screening processes and the Recommended Action.

6.1 CURRENT COMPLIANCE PROCEDURES

Current USEPA NEPA compliance procedures are resource and time consuming. When Region IV's Water Management Division determines an applicant to be a New Source, USEPA usually conducts a New Source meeting to inform the applicant of NEPA requirements and to request certain environmental information. Based on the information submitted, USEPA makes a preliminary decision to: (1) issue a finding of no significant impact (FONSI); (2) request additional information; (3) request the applicant to prepare an environmental information document (EID); or (4) require a Federally prepared environmental impact statement (EIS). Normally up to 30 days are required by USEPA to make this decision after the initial information is submitted. Once the decision is made, the following time frames could generally be expected:

- FONSI - 30 to 45 days for USEPA issuance;
- additional information - 45 days for applicant response plus 30 days for USEPA decision;
- EID - 90 days for applicant response plus 45 days for USEPA decision; and
- EIS - 365 days to complete plus 45 days for USEPA decision.

The NEPA compliance procedure ultimately results in either the issuance, issuance with conditions, or denial of the New Source NPDES permit.

Several new components based on the information and analyses performed in this EIA were developed which can be used in an environmental review. These components were not a part of the previous compliance program.

The first component involves the use of the USEPA Resource Atlas and the Geographic Information System (GIS) developed by the Kentucky Department for Natural Resources and Environmental Protection for environmental review decisions. The GIS was prepared subsequent to USEPA's Atlas and used much of its data. Most importantly, the GIS is a computerized system which may be frequently updated. These readily available data should greatly assist applicants in providing information and should expedite the environmental review process under any of the strategies.

A second component anticipates the use of standardized documents and/or language in FONSI's, Environmental Assessments, EID's, and EIS's based on the areawide environmental review and experience gathered in the NEPA compliance program for coal mining activities. This Areawide EIA has generated substantial analyses of impacts of and alternatives for mitigating the effects of mining operations. These discussions will be of significant value in preparing future review documentation.

A third component involves focusing on a smaller number of environmental issues. This Areawide EIA has identified the resource areas where the potential for significant impact exists and has examined the regulatory responsibility of other Federal and State agencies to determine the level of environmental protection already provided. USEPA is therefore able to concentrate its efforts on those resource impact areas that are not regulated by other agencies. This focusing will help avoid needless investigations.

A fourth component involves the SMCRA program, as well as the acceptance by USOSM of Kentucky's primacy for program implementation. USEPA has prepared its initial request for environmental data based on the assumption that the Commonwealth interim program will be in effect basically as now constituted. Under this assumption, duplication between the programs in terms of data requests will be avoided.

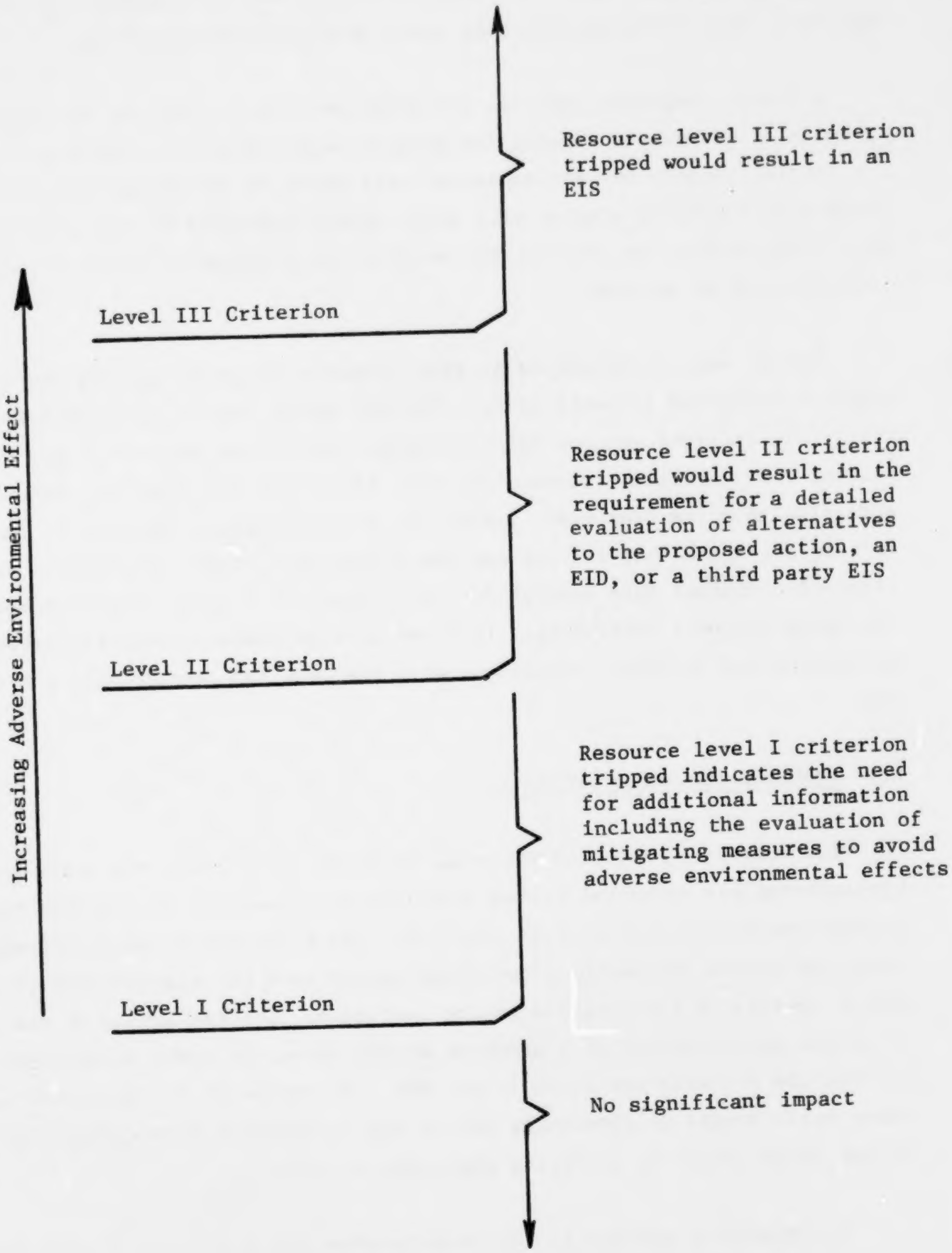
A final element developed in this areawide analysis involves the use of Resource Threshold Criteria (RTC). The RTC define levels of potential impacts that could initiate various USEPA environmental review actions (e.g., FONSI, request for additional information, EID, EIS). The RTC form the foundation of streamlining procedures under several of the strategies, but are not an integral part of all approaches for reasons described under those strategies. Section 6.2 discusses this concept further. Appendix A examines each Resource Threshold Criteria individually in terms of environmental impacts, costs to applicants and to USEPA, compliance with statutes and regulations, and flexibility.

6.2 RESOURCE THRESHOLD CRITERIA

The concept of Resource Threshold Criteria (RTC) forms the basis for streamlining environmental review decisions under several of the NEPA compliance strategies evaluated in this EIA. Using the RTC concept, information needs and permit processing times would depend upon the significance of environmental impacts of the proposed mining operation. The evaluation of the degree of environmental effect of a proposed mining operation would be measured against the criteria set forth in the RTC. As indicated in Figure 6.2-1, three basic levels or thresholds define four categories of environmental effect which result in differing responses by USEPA.

Environmental effects in any resource area which are less than a Level I threshold would be considered to be insignificant. A recommendation for permit approval would be made based on NEPA compliance as established in this

Figure 6.2-1. The use of Resource Threshold Criteria to determine USEPA permit review actions.


Resource level III criterion tripped would result in an EIS
Level III Criterion
Increasing Adverse Environmental Effect
Resource level II criterion tripped would result in the requirement for a detailed evaluation of alternatives to the proposed action, an EID, or a third party EIS
Level II Criterion
Resource level I criterion tripped indicates the need for additional information including the evaluation of mitigating measures to avoid adverse environmental effects
Level I Criterion
No significant impact

Areawide EIA. The determination that no significant impacts are anticipated based on the areawide review would be contained in the public notice of the proposed NPDES permit issuance.

Environmental effects which are equal to or greater than Level I would trigger the need for additional resource-specific information. This detailed information should be sufficient to enable the decision to be made as to whether the environmental impact is really insignificant (i.e., the Areawide EIA can be relied upon for compliance with NEPA) or is significant (i.e., above Level II and requires a detailed consideration of alternatives and impacts). If additional information indicates that Level II is not triggered, a FONSI would be prepared and distributed.

Environmental effects found to be significant would trip the Level II threshold. The need for preparation of an EID or a third party EIS by the applicant would be indicated. Essentially, this means that a detailed analysis of alternatives would be required. A permit approval recommendation could be made in lieu of an EID or EIS if the applicant redefined the permit area or utilized alternative methods of operation to reduce specific environmental effects to insignificant levels. Conditions outlining an applicant's proposed changes to his operation would be part of the permit. Further, a FONSI would be prepared citing the measures to be used to assure that no significant impacts would occur.

Any proposed activity which equals or exceeds the Level III threshold would be considered for permit action only after the completion of an EIS. This EIS could be prepared by either the conventional or third party process. USEPA would encourage the use of the third party process to avoid sequential decisionmaking and to expedite the environmental review process.

In response to these threshold levels, USEPA has developed draft Resource Threshold Criteria for the following resources:

- surface water and sensitive aquatic resources
- groundwater
- sensitive terrestrial ecosystems

- wetlands
- noise
- air quality
- environmentally significant agricultural land
- recreational land
- historic and archaeological sites
- public and Federal, State, and local government comments

Appendix A contains the Resource Threshold Criteria for each of the resource areas listed above and those areas which for various reasons were deleted in the evaluation process (i.e., overlap by other regulatory agencies or impacts were not considered significant or were not mitigatable). These draft RTC incorporate specific comments made following a USEPA internal review and review by State and Federal agencies. This review considered the detailed comments of the Kentucky Coal Association (KCA) as well as other industry spokesmen for each resource area. Where requested changes were determined to be appropriate, the draft RTC were modified.

Section 5.2 discussed the resource protection afforded through the Surface Mining Control and Reclamation Act administered by the Office of Surface Mining. The development of the RTC's and the areas of potential impact assumed the implementation of the interim program. As envisioned by the current legislation, the Commonwealth-administered permanent SMCRA program could control adverse environmental impacts in several of the areas which could be reviewed using the Resource Threshold Criteria. If SMCRA is significantly modified, USEPA's reliance on SMCRA's current interim program to mitigate significant impacts would have to be changed. If the Commonwealth reduces the requirements for the interim program, reconsideration of potential impact areas may be appropriate.

Each resource area is impacted to a different degree by coal mining activities. These impacts may be mitigated at varying levels for each resource. The associated costs to USEPA and the applicants vary considerably. Therefore, a single NEPA compliance strategy is not necessarily appropriate to mitigate all coal mining impacts. An individual review recommendation is made for each resource area. In addition to the alternatives available for each resource area, USEPA has the option of excluding certain resources altogether from the review process. This would demand fewer human and financial resources on the part of USEPA.

The permutations and combinations for use of these Resource Threshold Criteria are many. The incremental environmental benefit must be weighed against the demand for USEPA resources. The individual analyses of Resource Threshold Criteria include: (1) an estimation of the annual number of permit applications triggering the threshold levels; (2) the total annual cost to the applicant of supplying data, EID's, and EIS's to USEPA; and (3) the annual USEPA manpower and costs. The applicant and USEPA costs are based on the estimations of applications triggering certain threshold levels. Total applicant and USEPA costs are outlined for strategies using all Resource Threshold Criteria.

A number of advantages result from the use of the Resource Threshold Criteria:

- There is a reduction in the number and complexity of the individual decisions which must be made in evaluating applications. The focus is on critical issues. This approach would lead to substantial savings in time and ensure consistency among reviews.
- Coordination with Commonwealth and Federal agencies in the development of the Resource Threshold Criteria clarifies concerns and procedures at the outset. Agencies involved in the development of the Criteria would not need to be notified of any applications falling below the initial level.
- The coal mining industry is provided with a clearly established procedure which USEPA will use in evaluating environmental impacts of proposed operations. A copy of the mining applicant Environmental Information Request is included as part of Appendix B. Special attention has been given to clarity and data references.

6.2.1 Effect of Public Comment

The Public Comment Criteria referenced previously (which includes Federal, State, and local agency comments) play a key role in providing flexibility to the system. The resource threshold levels attempt to clarify the difference between insignificant and significant adverse impacts on environmental resources. However, because of the great variety of environmental resources potentially impacted as well as changes in the coal mining industry, the identified resources and levels may not always identify significant impacts. Therefore, public, local, State, and Federal agency comment can provide valuable input into the environmental review process by providing for a more comprehensive identification of any significant adverse impacts.

Some comments will be received by USEPA at the time the permit application is being reviewed. Most, however, will probably not be received until public notice of the proposed issuance of an NPDES permit has been given. At this point USEPA has already made a preliminary decision that the mining operation poses no significant threat to the environment. This decision may have been based on alternatives and mitigating measures in the form of permit conditions.

All comments received on a proposed NPDES permit could be reviewed by USEPA. Substantive issues dealing with any of the resource areas could be considered, reviewed, and decisions made on the basis of the following levels:

Level I	Significant issues raised by public, local, State, or Federal parties on a resource area not otherwise identified or adequately addressed.
Level II	Significant adverse impacts are likely to result to resource area identified under Level I.
Level III	Unmitigated significant adverse impacts will result to resource area identified under Level I.

6.3 ALTERNATIVES

Four alternative NEPA compliance strategies, some with variations, were chosen for detailed consideration. The general strategies are described as Individual, Areawide, Areawide-Individual, and Areawide-Subareawide-Individual alternatives. The No Action Alternative was also evaluated. Each potential alternative is evaluated for NEPA compliance on the basis of:

- environmental benefits
- manpower and cost
- processing time
- compliance with statutes and/or regulations
- elimination of duplication of effort
- flexibility

A description of each general alternative follows.

6.3.1 No Action Alternative

This alternative assumes that USEPA Region IV would avoid determining New Sources for the coal industry and would entail the use of NEPA compliance activities only when requested by the applicant or an outside party, whether Federal, State, or local. This alternative results in maximum environmental degradation occurring for the majority of coal operations with some substantial environmental protection benefits occurring on those operations brought to the attention of USEPA.

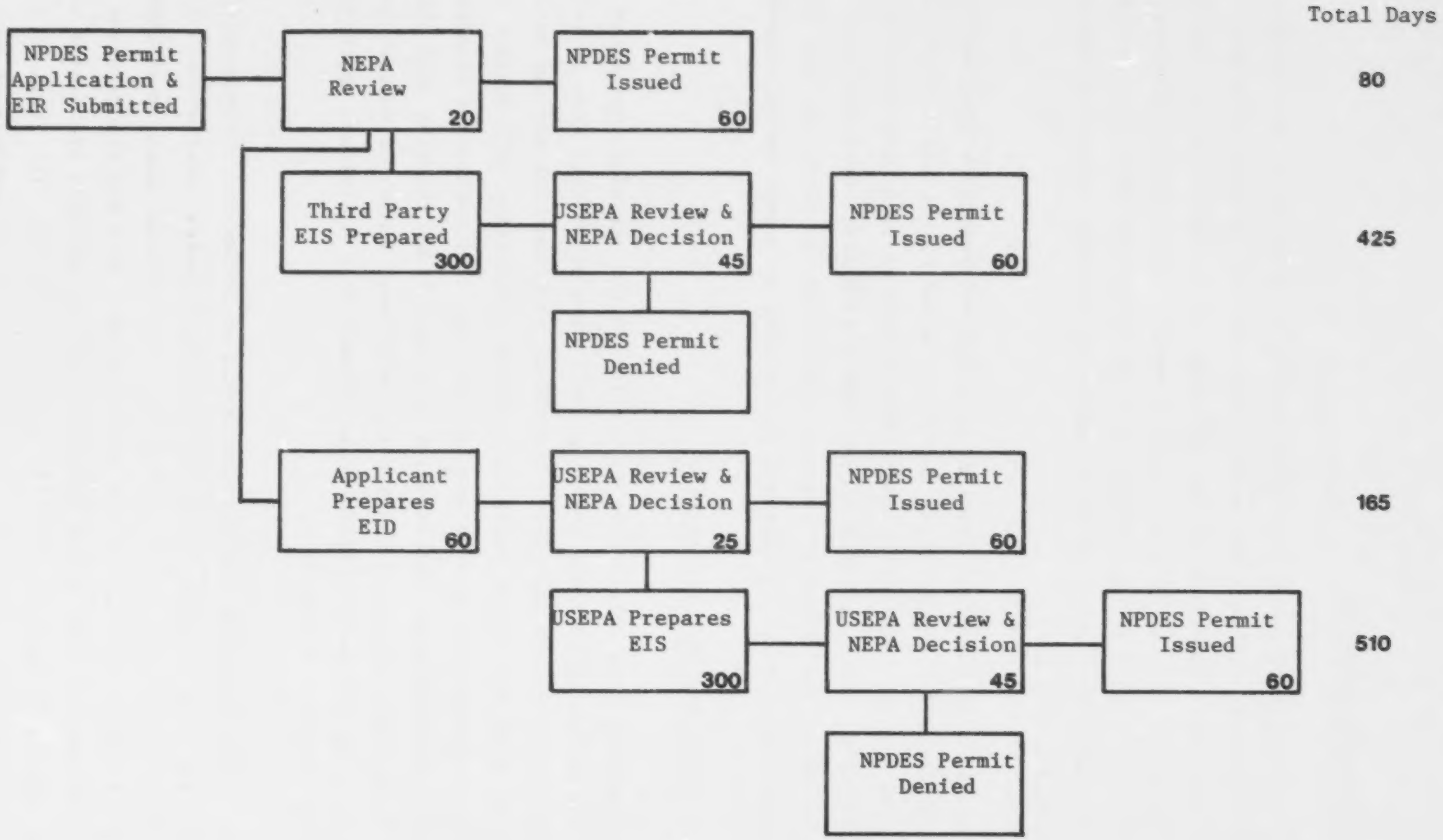
The No Action Alternative involves very minimal resources (one man-year of effort currently). Should legal challenges occur to the use of this alternative in the future, significant additional resources to defend lawsuits could be required. This approach allows some flexibility regarding which projects are addressed, however, resource limitations preclude any real flexibility since all manpower is consumed in reacting to issues raised elsewhere.

6.3.2 Individual Review Alternative

Procedurally, this alternative is similar to the existing compliance process. It basically involves changing the number of reviews from approximately 20 per year to 350 per year. Individual environmental reviews would be conducted for each New Source NPDES coal mining application with FONSI's or EIS's being prepared on a case-by-case basis. The four components discussed previously (available data, standardized language, issue focusing with the RTC, and State/USEPA coordination) and the additional number of reviews performed constitute the primary differences between this individual approach and the existing compliance program.

Figure 6.3-1 indicates the various levels of review and corresponding time frames that are possible using the Individual Review Alternative. Although reviews would still be conducted on a case-by-case basis, some time savings would result with use of the available data base and standardized language. Processing time frames described for the existing procedures would likely be reduced by approximately 15% to as much as 50%. The level of environmental protection would be high due to the site-specific analysis of each application.

Figure 6.3-1. Individual Review Alternative for NEPA review process for the issuance of New Source coal mining NPDES permits in eastern Kentucky.


Total Days
NPDES Permit Application & EIR Submitted
NEPA Review 20
NPDES Permit Issued 60
80
Third Party EIS Prepared 300
USEPA Review & NEPA Decision 45
NPDES Permit Issued 60
425
NPDES Permit Denied
Applicant Prepares EID 60
USEPA Review & NEPA Decision 25
NPDES Permit Issued 60
165
USEPA Prepares EIS 300
USEPA Review & NEPA Decision 45
NPDES Permit Issued 60
510
NPDES Permit Denied

Numbers represent estimated days required to complete each action.

Under this alternative, the environmental review process would be conducted individually for each application. Full public notice and appeal opportunities under NEPA would be available. Public or agency opposition to environmental review decisions made in conjunction with the issuance of a particular permit and the supporting FONSI or EIS would be considered through established procedures.

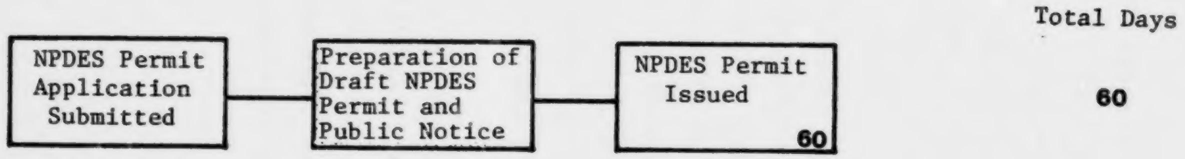
The Individual Review Alternative anticipates the availability of ample financial and human resources with which USEPA could conduct the large volume of individual reviews and comply with NEPA requirements. It was originally estimated based on USEPA and consultant studies that 30 USEPA man-years would be required to perform NEPA compliance using this approach. Due to the detailed analysis conducted in developing the Resource Threshold Criteria and the data base developed for this EIA, it is now estimated that approximately one-third this amount (i.e., approximately 10 manyears) would be required.

This alternative would fully comply with USEPA's statutory responsibilities. It would also allow for virtually complete flexibility in handling site-specific impact mitigation and NEPA processing. This alternative has the greatest possibility for duplication of effort between USEPA and other Federal and State agencies because the responsibilities of other agencies are not considered.

6.3.3 Areawide Review Alternative

The Areawide Review Alternative assumes that the Eastern Kentucky Coal Field Areawide EIA and the analysis therein would constitute the substantive analysis for all future actions regarding permitting of New Source coal-related operations. Figure 6.3-2 indicates the general permit process that is used with the Areawide Review Alternative. There are three options available to the Agency to implement this kind of a strategy. USEPA could: (1) argue that no future action by USEPA would result in significant impacts; (2) argue that although some actions may cause significant impacts there are no means available to mitigate these impacts; or (3) develop general conditions to be placed on all permits to address the identified significant impact areas. A more detailed discussion of each follows.

Figure 6.3-2. Areawide Review Alternative for NEPA review process for the issuance of New Source coal mining NPDES permits in eastern Kentucky.


Total Days
NPDES Permit Application Submitted
Preparation of Draft NPDES Permit and Public Notice
NPDES Permit Issued
60
60

Numbers represent estimated days required to complete each action.

6.3.3.1 Areawide Finding of No Significant Impact

This alternative would be intended to satisfy USEPA's substantive NEPA review responsibility for all New Source NPDES permitting in eastern Kentucky through a single document, this Areawide EIA. All substantive NEPA review requirements would be handled at the time of the issuance of the EIA. A NEPA review of individual applications would not be carried out with this alternative. Rather, the public notice on each permit would reference the Areawide EIA conclusion that no significant impacts would be anticipated through a brief standard FONSI statement.

Processing time and manpower requirements for site-specific environmental reviews and decisions on FONSI's, EID's, and EIS's would be eliminated. Region IV would issue New Source mining permits based totally on the identification of no significant adverse impacts and the description of mitigative measures available through other Federal, State, and/or local programs identified in the Areawide EIA. All impacts of coal mining in the Eastern Kentucky Coal Field would either be characterized as not significantly affecting the quality of the environment or as subject to mitigation by another agency.

This option affords the least environmental protection and the least opportunity for minimizing significant adverse impacts. It would involve no attempt to mitigate adverse impacts either through assistance to applicants or through the imposition of permit conditions. This NEPA compliance strategy would not address any site-specific impacts from a particular coal mining or coal-related facility, and as such would make it difficult to justify as meeting NEPA requirements. The major areas that would not receive consideration by USEPA are: (1) environmentally sensitive terrestrial and aquatic resources; (2) noise; (3) fugitive dust generation on haul roads; (4) water supply intakes; (5) wetlands; (6) archaeological and historical resources; and (7) groundwater. These resources are typically not considered at the local or State level or by another Federal agency. Significantly less mitigation of adverse impacts would result should USEPA select this alternative.

The Areawide FONSI Alternative is potentially the most direct and expedient method to administer the permitting program for the Eastern Kentucky Coal

Field. It is the least costly to the mining applicants, since they would not be providing USEPA with detailed environmental data for analysis. However, it is arguable that with this broad brush review approach the goals of NEPA would not be furthered. In addition, the likelihood of a lawsuit challenging the strategy is greater under this option than under any other except the No Action Alternative. The delay such a legal challenge would have on specific permit issuances cannot be accurately estimated. A successful legal challenge of this approach could require further revisions of the Areawide EIA.

Procedurally, a short standard FONSI statement would be included in the notice of each permit. Concerns involving unique site-specific environmental impacts could not be met under this alternative, thus making legal challenges to permit issuance more likely.

This alternative does provide the greatest opportunity for elimination of duplication of effort. Little would be done by USEPA that could duplicate other agencies' efforts. This alternative, however, is the least flexible of all considered.

6.3.3.2 Impacts not Mitigatable by USEPA

This option would change this EIA to an EIS which would argue that there are no means available to mitigate some types of impacts, even though they may be significant. USEPA Region IV would issue New Source mining NPDES permits recognizing that some types of significant adverse impacts may occur for which there are no mitigative measures available for USEPA or other Federal, State, and/or local programs to implement. USEPA would argue, however, that although significant these impacts would not justify denial of an NPDES permit.

Processing time and manpower requirements for site-specific environmental reviews and decisions on FONSI's, EID's, and EIS's would be similar to the Areawide FONSI alternative discussed above. There would be a corresponding lack of environmental protection. This option is also a direct and expedient method to administer the permitting program for eastern Kentucky. It is one of the least costly in the short run to mining applicants. However, it too entails a likelihood for lawsuits challenging the strategy which could cause delays in permit issuance. There would be little duplication of effort since USEPA would be doing virtually nothing that could duplicate other agencies' efforts. This approach has no flexibility concerning impacts.

The argument for this option is that Federal agencies should only expend manpower and taxpayers' dollars to address issues for which mitigation is available and can be implemented by USEPA. This option might not fully comply with existing regulations that require the Agency to address alternatives available to all parties, not only USEPA. The argument of marginal utility could be made--the cost of compliance and enforcement far outweighs the environmental benefit of the potential mitigative measures.

6.3.3.3 General Conditioning

This option would establish general conditions that would apply to each New Source coal facility permit applicant. These conditions would be developed and fully described in the Areawide EIA. A condition would be written for each resource area for which significant impacts might occur. As part of each condition, a description of when that condition would be applicable would be included. Procedurally, a very brief FONSI statement would be included in the notice of each permit.

The resource areas described in Section 6.2 would be the areas of major emphasis. General permit conditions could be imposed which would mitigate impacts on any or all of these resource areas. The permit conditions could recognize that any one of several options to mitigate adverse impacts would be satisfactory.

This alternative could be argued to result in potentially significant environmental benefits because every permit would require the imposition of these conditions. However, since the general conditions would necessarily be environmentally conservative, this alternative would at times result in costs imposed on the permittees which would not be imposed under site-specific review alternatives.

This alternative would not require additional manpower to perform individual reviews since each permit would have the same conditions. There would clearly be other resources required to be available under this option, however, since there would likely be a number of adjudicatory hearings requested by applicants objecting to the imposition of conditions. The actual man-years required to prepare for and hold these hearings are unknown.

An opportunity to contest the environmental review process would be available after the Areawide EIA has been issued through comment on the brief FONSI. Also, opportunity to review the NPDES conditions would be available through the standard permit review process.

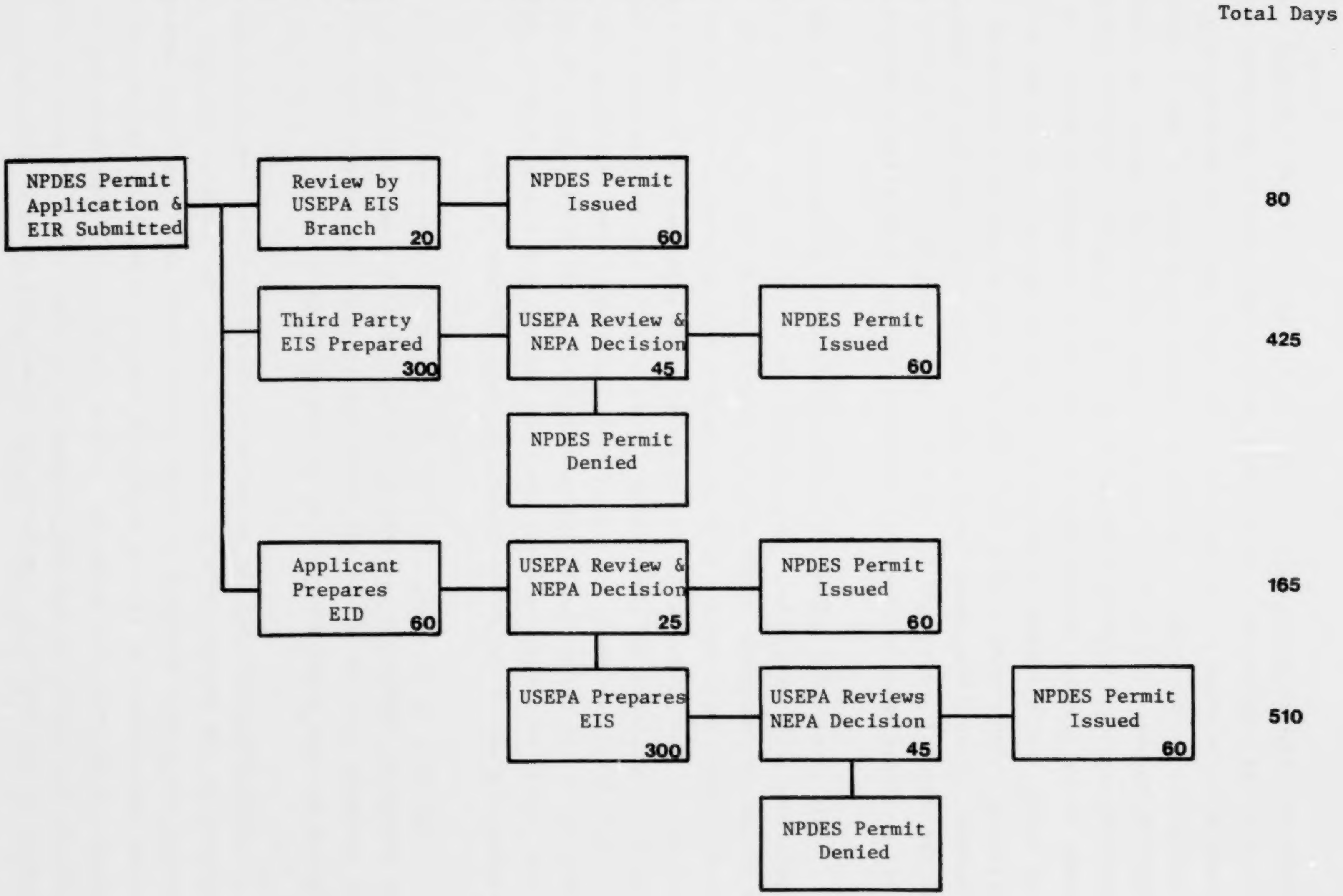
Several problems could be encountered with this method of using conditions. General conditions are by their nature a quick but inflexible regulatory mechanism. Site-specific analysis and documentation of the appropriateness of any conditions would be lacking. Providing the site-specific documentation to support conditions in an adjudicatory hearing would not be possible. This option would make it more difficult for an innovative and potentially more effective control measure to be instituted. This could potentially contribute to stifling new ideas in impact mitigation.

6.3.4 Areawide-Individual Combined Review Alternative

This alternative combines the last two general approaches described into a single strategy using the Resource Threshold Criteria. This Areawide EIA would be the substantive basis for satisfying USEPA's NEPA responsibility for those New Source coal activities which do not create significant adverse environmental impacts (i.e., those which are considered below Level I for each of the Resource Threshold Criteria). Where applications trigger Level I, individual environmental reviews would be undertaken. Figure 6.3-3 indicates the various levels of review and corresponding time requirements that could result using this alternative.

This approach would involve an initial review to determine whether additional information is needed to determine if significant impacts are likely to occur from the proposed project. If not, a fast track permit and brief FONSI

Figure 6.3-3. Areawide-Individual Combined Review Alternative for NEPA review process for the issuance of New Source coal mining NPDES permits in eastern Kentucky.


Total Days
NPDES Permit Application & EIR Submitted
Review by USEPA EIS Branch 20
NPDES Permit Issued 60
80
Third Party EIS Prepared 300
USEPA Review & NEPA Decision 45
NPDES Permit Issued 60
425
NPDES Permit Denied
Applicant Prepares EID 60
USEPA Review & NEPA Decision 25
NPDES Permit Issued 60
165
USEPA Prepares EIS 300
USEPA Reviews NEPA Decision 45
NPDES Permit Issued 60
510
NPDES Permit Denied

Numbers represent estimated days required to complete each action.

statement issuance process would occur. If the initial review indicated that there is the possibility of significant impact, then specific additional questions would be asked of the applicant. The USEPA would then evaluate this information to determine if significant impacts are likely. If not, a FONSI would be issued. If the determination is that significant impacts are likely, then the applicant would be required to develop and evaluate specific alternatives to the proposed project that would mitigate the potential impact. If the impact can reasonably be mitigated and the mitigation is acceptable to the applicant, then a permit condition stipulating the mitigative action would be imposed. If not, the Agency would prepare an EIS fully analyzing the impact of the proposed project and any alternatives. A more detailed description of this procedure using the Resource Threshold Criteria is provided in Section 6.2.

This alternative utilizes a process where NEPA requirements for mining operations with insignificant impacts would be satisfied very rapidly and with a minimum of resources. USEPA would cite the Areawide EIA and the finding that no significant impacts would be expected when no Level I criterion was triggered. The public notice on the permit would reference the Areawide EIA for NEPA compliance for these insignificant projects and would contain a brief standard FONSI statement. If significant issues are raised contesting the adequacy of the environmental decision that led to the draft permit, an individual review of the mining operation could result. Such issues would be raised through the use of the Public Comment Criteria (Section 6.2.1).

Depending on the significance of the identified impact and its ability to be mitigated, additional information, an EID, or an EIS would be required. It is estimated that 70% of all New Source applications (or 245 per year) would follow the fast track procedure using this strategy.

This alternative has the potential to result in significant environmental benefits to the Eastern Kentucky Coal Field area. The Resource Threshold Criteria have been developed to focus efforts on the most significant impact areas. Significant mitigation of adverse impacts on sensitive terrestrial and aquatic ecosystems, from noise due to truck traffic, from dust emanating from unpaved haul roads, on groundwater quality, on water supply intakes, on archaeological and historical resources, and on wetlands would be realized.

Approximately 1.5 manyears would be required to minimally handle the workload anticipated using this compliance alternative. An additional $320,000 is estimated to be required to prepare the site-specific analyses or EIS's where the applicant determined that the conventional EIS route should be used.

This alternative has advantages in the time necessary to process a permit. In comparison to time frames for existing procedures, processing times under the Areawide-Individual Combined Review Alternative would be reduced substantially:

- From the date the applicant responds to the initial questions and additional questions (if required):
  - immediate screening by the NPDES permitting staff and draft NPDES permit preparation if the application does not trip any initial thresholds (i.e., an insignificant impact), or
  - 20 days for an applicant response and 20 additional days to a USEPA decision (i.e., FONSI or EID) where an application trips one or more initial threshold and additional questions are involved.
- EID - approximately 60 days for applicant response plus 25 days for a USEPA NEPA decision.
- EIS - 300 days or more to complete.
- The time frame required to prepare and circulate the NPDES permit is in addition to these time frames. It is projected that an additional 60 days is required to complete permit issuance.

This alternative has the potential of employing a direct, expedient approach for those operations with little environmental effect, while retaining a method to effect environmental protection and impact mitigation for operations with potentially significant adverse impacts. This alternative would fully comply with USEPA statutory requirements for NEPA compliance. Further, the flexibility of this alternative is higher than any others except the general conditioning approach described below.

A variation of this strategy could also be used to include the option of conditioning a permit at an earlier stage. The general conditioning approach could be modified to make use of the Resource Threshold Criteria to insert standard NEPA based permit conditions related to the site-specific environmental impacts. When a permit application is received by USEPA, a determination could be made by a permit writer as to whether or not the proposed operation meets or exceeds any Level I Resource Threshold Criteria (Section 6.2). If it does, standard conditions would then be inserted in the NPDES permit. A brief standard FONSI statement would be included in the notice of each permit.

This alternative would result in potentially significant environmental benefits. Every permit triggering a Level I criteria would have the imposition of a permit condition. Although the condition might not be appropriate in every case, this approach could be argued to be environmentally conservative for those resource areas covered.

This option would require additional effort for review to determine when a condition would be required due to meeting or exceeding Level I criteria. There would also be additional resources required under this option as with the previous general conditioning option since adjudicatory hearings could be expected. The actual number of man-years required is unknown, but would likely be less than the conditioning option without the initial review.

An opportunity to contest the environmental review process could be argued to be available after the Areawide EIA has been issued through review of the brief FONSI included in the permit notice. Opportunity to review the NPDES conditions and to comment on their consistency with the areawide requirements would also be available through the standard permit review process.

This alternative is more flexible than the general conditioning option, but suffers from the same basic problems. The initial information submitted in the applicant questionnaire would rarely be sufficient to fully document the need for the specific permit conditions. Standard conditions are by their nature a quick but inflexible regulatory mechanism. Site-specific analysis and documentation of the appropriateness of any conditions would still be lacking. Providing site-specific documentation to support conditions in an adjudicatory hearing would not be possible. This option would also make it more difficult for an innovative and potentially more effective control measure to be instituted. This could again contribute to stifling new ideas in impact mitigation.

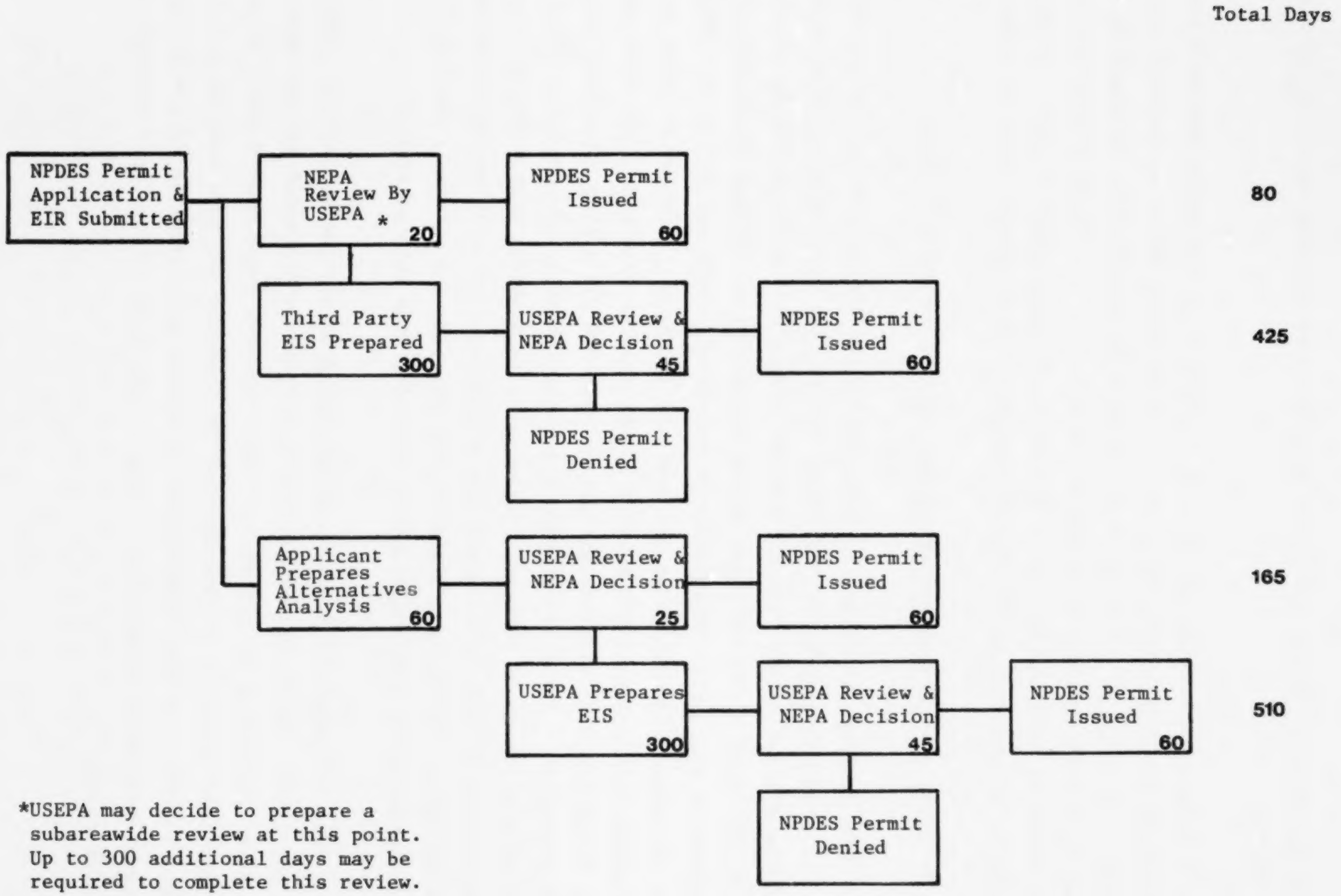
A detailed investigation or each resource area evaluating the different strategies for possible inclusion in an Areawide-Individual approach is included as Appendix A. The implications of an areawide FONSI, unmitigatable impacts, general condition, standard condition, or individual review strategy are evaluated in detail for each identified impacted resource area. A recommendation of the most appropriate strategy for each resource area is given.

6.3.5 Areawide-Subareawide-Individual Combined Review Alternative

This strategy is virtually identical to the Areawide-Individual Combined Review Alternative with one additional option. If the region which surrounds a proposed permit area: (1) has similar sensitive resources; (2) is projected to be the focus of intense coal mining interests; or (3) has the potential for significant cumulative impacts on the watershed, USEPA may decide to conduct its own subareawide review prior to permit issuance. This review could ultimately reduce the number of New Sources in the subarea requiring individual analysis by establishing standard mitigative measures for mining activities within its boundaries. USEPA review time and applicant costs for providing detailed information should be reduced. Although it is doubtful that USEPA would make frequent use of this subareawide review approach, it would further increase the Agency's flexibility. Figure 6.3-4 indicates the various levels of review and corresponding time requirements resulting from this alternative.

This strategy outlines an approach based on options to evaluate permits on any level. The environment would be adequately protected against adverse impacts from mining operations and USEPA resource requirements would be relatively low. Overall, processing time requirements would be reduced as described under the Areawide-Individual approach (unless a subareawide review was required which would necessitate a longer time frame similar to a site-specific EIS process).

Figure 6.3-4. Areawide-Subareawide-Individual Combined Review Alternative for NEPA review process for the issuance of New Source coal mining NPDES permits in eastern Kentucky.


Total Days
NPDES Permit Application & EIR Submitted
NEPA Review By USEPA * 20
NPDES Permit Issued 60
80
Third Party EIS Prepared 300
USEPA Review & NEPA Decision 45
NPDES Permit Issued 60
425
NPDES Permit Denied
Applicant Prepares Alternatives Analysis 60
USEPA Review & NEPA Decision 25
NPDES Permit Issued 60
165
USEPA Prepares EIS 300
USEPA Review & NEPA Decision 45
NPDES Permit Issued 60
510
NPDES Permit Denied

*USEPA may decide to prepare a subareawide review at this point. Up to 300 additional days may be required to complete this review.

Numbers represent estimated days required to complete each action.

6.4 COMPARISON OF ALTERNATIVES

Each of the alternatives described above have advantages and disadvantages in terms of the level of environmental benefit, costs, processing time, compliance with USEPA's statutory responsibilities, the elimination of duplication of effort, and flexibility. This section compares the alternatives in terms of these parameters. A comparison of the alternatives by specific resource categories is also presented.

6.4.1 Environmental Benefit

The level of environmental benefit or protection provided by the alternatives varies widely. The greatest level of environmental protection is afforded by the Individual Review Alternative while the least amount of protection is provided by the Areawide Review Alternative. The two Combined Review Alternatives also provide for a level of environmental protection similar to the Individual Review Alternative.

The Individual Review Alternative provides the highest level of environmental protection through the project-specific review required of all proposed New Source mining operations. These individual project reviews would utilize the Resource Threshold Criteria to determine possible impacts to surface water quality and quantity including threatened and endangered aquatic species habitats; groundwater quality and quantity; sensitive terrestrial ecosystems including threatened and endangered species habitats; wetlands; sensitive noise receptors such as residences, schools, and health care facilities; sensitive fugitive dust receptors located along unpaved public haul roads; environmentally significant agricultural land except those prime farmlands already protected by SMCRA provisions; recreational land; and those historic or archaeological sites considered eligible for inclusion on the National Register of Historic Places. USEPA has identified these resource areas as being sensitive to coal mining activities, not protected by other Federal or State regulations, and requiring protection under NEPA. In addition to these resource areas, USEPA can respond to other significant adverse impacts that may be identified through the public comment process which allows the general public, other Federal agencies, and State and local governments to voice concerns about aspects of a particular mining operation. Through this individual review process, USEPA can provide the maximum level of environmental benefit.

At the opposite end of the spectrum, the Areawide Review Alternative provides little environmental protection. This alternative does not provide for site-specific environmental reviews of proposed New Source mining operations, therefore no protection against unique site-specific adverse impacts would result. Some environmental protection could result using the general conditioning option which requires mitigation of impacts through general permit conditions; however, conditions would not be tailored to site-specific impacts. Little environmental benefit would be realized through the Areawide Review Alternative.

Both the Areawide-Individual and Areawide-Subareawide-Individual Combined Review Alternatives provide a high level of environmental protection. As in the Individual Review Alternative, the Resource Threshold Criteria would be utilized to determine possible impacts to each of the ten resource areas identified by USEPA. Unlike the Individual Review Alternative, an initial review of the proposed mining operation could result in prompt permit issuance if no possibility of adverse impact is identified (no Level I thresholds are met). In effect, these combined review alternatives will provide for a project-specific environmental review when the possibility of adverse impacts is identified while allowing for fast-track permit processing when no potential impacts are found. The implementation of either of these alternatives would result in a substantial level of protection of surface water and groundwater, sensitive aquatic and terrestrial ecosystems, wetlands, environmentally significant agricultural land, recreation land, sensitive noise receptors, sensitive receptors of fugitive dust, and historic and archaeological sites as described above for the Individual Review Alternative.

6.4.2 Manpower and Costs

The additional manpower requirements necessary for USEPA to implement the various alternatives ranges from zero with the Areawide Review Alternative, to approximately 1.5 manyears for the Areawide-Individual and Areawide-Subareawide-

Individual Review Alternatives, to 10 manyears for the Individual Review Alternative. Estimated USEPA financial commitments for the preparation of site-specific EIS's would range from zero with the Areawide Review option to $320,000 with the Areawide-Individual and Areawide-Subareawide-Individual Review Alternatives. NPDES permit applicants will incur costs for supplying environmental data and preparing the EID's or EIS's that might be required under some of the review alternatives. No costs would be incurred by applicants under the Areawide Review Alternative since no environmental data or EID's/EIS's are required in order to obtain the NPDES permit. With the Individual, Areawide-Individual, or Areawide-Subareawide-Individual Alternatives, USEPA has estimated the applicants would spend a total of $2.2 million annually to provide the environmental data and EID's/EIS's required by USEPA. This cost figure is based on the 350 New Source NPDES permit applications expected annually from eastern Kentucky. Applicants would spend more than three times this amount, or approximately $17 million, to provide the mining plans and other data necessary to obtain the BSMRE mining permit under the interim OSM program. The costs associated with obtaining the NPDES permits are minute when compared with the $3.2 billion in annual revenues generated by coal mining in the Eastern Kentucky Coal Field.

6.4.3 Processing Time

The amount of time required by USEPA to process an NPDES permit application from the receipt of all information required of the applicant will vary with each alternative. The Individual Review Alternative would require a minimum of 80 days if a FONSI were issued to more than 500 days if an EID and EIS were required. The Areawide Review Alternative would require only 60 days to issue a permit since no individual environmental reviews would be performed on the proposed mining operations under this alternative. Using the Areawide-Individual Combined Review Alternative an NPDES permit could be processed within 60 days if the initial review of the EIR indicates no significant impacts will occur. Otherwise, permit issuance would require from 80 to more than 500 days as in the Individual Review Alternative. Processing time for the Areawide-Subareawide-Individual Combined Review Alternative would be the same as for the Areawide-Individual Combined Review Alternative unless a subareawide review were required which necessitates an additional 300 or more days to prepare. Subsequent permit application located within the subarea would be greatly expedited, however, after the subareawide review is prepared.

6.4.4 Compliance With USEPA's Statutory Responsibilities

USEPA's statutory responsibilities would be fully met using the Individual Review, Areawide-Individual Combined Review, or the Areawide-Subareawide-Individual Combined Review Alternatives. The three options available under the Areawide Review alternative present the likelihood of legal challenges occurring because of the lack of consideration of site-specific issues.

6.4.5 Duplication of Effort

In terms of eliminating the duplication of effort of other agencies, the Individual Review Alternative is least desirable because resource areas that other agencies are responsible for would also be reviewed by USEPA. The three options under the Areawide Review Alternative do not include site-specific environmental reviews; therefore, no duplication of effort would occur. The Areawide-Individual and Areawide-Subareawide-Individual Combined Review Alternatives include reviews of environmental resource areas not covered by other agencies, therefore eliminating the possibility of duplication of effort while still providing environmental protection.

6.4.6 Flexibility

In terms of the ability of an alternative to identify and mitigate site-specific impacts and allow expedient permit processing, the Individual Review Alternative has complete flexibility whereas the options available under the Areawide Review Alternative are very restrictive and have virtually no flexibility. The Areawide-Individual and Areawide-Subareawide-Individual Combined Review Alternatives combine the flexibility of the Individual Review Alternative and significantly simplify permit processing.

6.4.7 Resource Specific Comparison

A comparison of review alternatives was conducted for each of the 14 environmental resource areas in order to determine the most advantageous alternative for each specific resource. The methodology employed in this comparison consisted of summarizing the impacts of coal mining activities on the resource, outlining the technical alternatives available to mitigate adverse impacts, cataloging existing Federal and State regulations that control mining impacts on the resource, analyzing how each review alternative would address the potential impact, evaluating the costs and benefits of the alternatives available in terms of USEPA manpower requirements and costs as well as applicant costs, and recommending a preferred alternative that would fulfill USEPA's statutory responsibilities and mitigate impacts to the individual resource. Appendix A contains this detailed analysis of alternatives for each of the 14 resource categories.

6.5 THE SELECTED ACTION

6.5.1 Resource Specific and Overall Recommendation

The results of the resource specific analysis of alternatives (Appendix A) indicate that for 10 out of 14 resource areas, the Areawide-Individual Combined Review Alternative would best fulfill USEPA's responsibilities. The four resource areas for which this alternative was not recommended (transportation, socioeconomics, geology, and floodplains) were found to be adequately protected from adverse impacts of coal mining by other State or Federal regulations.

All of the alternatives and their variations present distinct advantages over the NEPA compliance process currently used by USEPA. The Individual Review Alternative and the Areawide Review Alternative with the FONSI option are on either end of the NEPA compliance spectrum. They differ dramatically in terms of environmental benefits, USEPA resource demands, overall processing time requirements, and flexibility to accommodate specific situations. From an environmental protection perspective, the former approach is highly preferable. However, the USEPA resources required are not reasonable given the current personnel and funding allocations. The Areawide FONSI, on the other hand, is superior from a cost, processing, and manpower standpoint, but deficient in terms of environmental benefits, ability to withstand legal challenges, and flexibility. The Areawide-Subareawide-Individual Combined Review Alternative, however, provides a high level of environmental benefits with moderate manpower and financial requirements and a greater degree of flexibility to accommodate specific problems that may occur during the permit review process.

The Areawide-Subareawide-Individual Combined Review Alternative is selected as the Proposed Action because it provides USEPA with the greatest number of options and flexibility in performing its NEPA-related duties. There are, however, certain consequences--both positive and negative--that will result from implementing this alternative.

6.5.2 Permit Review Procedure

Using the Selected Action, a step-by-step procedure would be followed to accomplish the environmental reviews required under NEPA for New Source NPDES permit issuance. Generally, this procedure is as follows:

1. Determine if applicant is classified as a New Source.
2. Applicant provides environmental information.
3. USEPA reviews EIR.
4. A FONSI is issued if no Level I Resource Threshold Criteria (RTC) are triggered.
5. If Level I RTC is triggered applicant supplies additional data from which the significance of the impact can be determined.
6. If impact is determined to be insignificant or mitigatable, an Environmental Assessment (EA) and FONSI is prepared.
7. If a Level II RTC is triggered, an evaluation of alternatives or an EID is prepared by applicant.
8. If a Level III RTC is triggered, and EIS is prepared by USEPA or third party.
9. Issue permit, issue permit with conditions, or deny permit.

Using the Selected Action, the review of NPDES permit applications would be streamlined to the greatest extent possible while maintaining a high level of environmental protection.

7.0 CONSEQUENCES OF THE SELECTED ACTION

The implementation of the Selected Action, the Areawide-Subareawide-Individual Combined Review, will result in both adverse and beneficial impacts on the environment of the Eastern Kentucky Coal Field, on applicants for New Source coal mining NPDES permits in the Coal Field, and on USEPA. Impacts on the environment are described in terms of the level of protection provided for the sensitive resources of eastern Kentucky by the Selected Action. Impacts to the New Source coal mining NPDES permit applicants and USEPA are described in terms of temporal effects, manpower requirements, and/or financial impacts.

7.1 ENVIRONMENTAL CONSEQUENCES

The Selected Action has been developed to provide for environmental reviews of New Source coal mining activities with a sufficient level of detail to identify probable adverse impacts to sensitive resources. The resources that have been identified as particularly sensitive to coal mining activities and that are not protected by other Federal or State regulatory programs include surface water, groundwater, sensitive ecosystems identified by KNPC, wetlands, significant agricultural land as defined by USEPA national policy, recreational land, noise, air quality, and cultural resources.

The Selected Action will provide protection for certain sensitive surface water resources that occur within five miles downstream of a proposed effluent discharge. These resources include stream segments that are: (1) designated or proposed for domestic water supply; (2) designated or proposed as coldwater aquatic habitat; (3) designated or proposed as an Outstanding Resource Water of the Commonwealth; (4) identified as a Sensitive Aquatic Ecosystem by KNPC; (5) identified as a high or moderate water quality stream by KNPC; and (6) likely to be inhabited by a Federally listed or proposed species in danger of extinction or threatened with endangerment. Under the Selected Action, a proposed mining operation with a discharge that occurs within five miles upstream of one of these sensitive stream segments would be reviewed in more detail in order to assess the exact nature of possible impacts on the sensitive resource. This procedure assures the protection of the resource against mining-related impacts that may alter species composition, reduce water use opportunities, or otherwise adversely impact any of the sensitive characteristics of the resource.

Groundwater quality and quantity would be protected by the review procedure incorporated in the Selected Action. The existance of private water supply wells within 2,000 feet of the permit area of a proposed coal preparation plant or underground mine permit area, and public water supply wells within one mile of the proposed permit areas would initiate site-specific groundwater reviews (if the producing aquifer is not hydraulically separated from potential pollution sources such as spoil stockpiles and refuse disposal areas). In this way, the quality and quantity of local groundwater resources will be protected by requiring permit applicants to investigate alternatives and address mitigative measures in more detail.

Sensitive terrestrial ecosystems as identified by KNPC and areas identified by KNPC that are likely to be inhabited by Federally listed or proposed species in danger of extinction or threatened with endangerment would be protected from possible adverse mining impacts by the Selected Action. Mining-related surface disturbances within 2,000 feet of sensitive terrestrial ecosystems will require additional investigations by the applicant and USEPA to determine the possibility of adverse impacts on the area. If significant adverse impacts are determined likely to occur from the proposed mining operation, mitigative measures will be developed to reduce or eliminate the impacts to acceptable levels before issuance of the NPDES permit.

Wetlands would be protected by the Selected Action through the site-specific review to be initiated if the proposed mining-related surface disturbances occur within or adjacent to wetlands. The site-specific review would also be required when coal mining operations discharge wastewater into or hydraulically modify a wetland area. The site-specific review will determine the significance of any impacts occurring to wetlands so that mitigative measures can be developed to counteract adverse impacts.

Environmentally Significant Agricultural (ESA) lands as defined by USEPA national policy would be protected from significant adverse impacts by the site-specific review requirements of the Selected Action. Coal mining activities, exclusive of coal haul roads and preparation plant sites, that cause surface disturbance on ESA land, except those prime farmlands protected by SMCRA, will be reviewed on a case-by-case basis to determine the significance of impacts and develop mitigation where required. This review procedure will prevent the permanent conversion of ESA land and protect this valuable natural resource.

The Selected Action will protect recreational land from the adverse impacts of coal mining activities. Proposed coal mining operations, including public and private haul roads, located within 2,000 feet of a public park, National Park, National Wildlife Refuge, State Wildlife Management Area, National System of Trails, Wilderness Area, or State or National Wild, Scenic, or Recreational River will receive individual reviews to determine the possibility and significance of adverse impacts caused by noise pollution, air pollution, or other forms of pollution that would degrade the quality of recreational opportunities at the facility. This review and the resultant mitigative measures or permit action will protect recreational lands from any significant adverse impacts of mining operations.

The Selected Action will preserve air quality in the Coal Field by protecting sensitive receptors from unhealthy levels of fugitive dust emissions that may result from coal haul truck traffic on unpaved off-site haul routes. Proposed mining operations that would generate enough truck traffic on unpaved haul routes to exceed the National Ambient Air Quality Standards for total suspended particulates at nearby sensitive receptors (as determined by a simple nomograph) would be reviewed individually in order to determine the significance of possible impacts. Alternative haul routes or other mitigative measures would be required before the NPDES permit is approved if significant adverse impacts are likely to occur.

Sensitive noise receptors such as residences, health care facilities, churches, or educational facilities located near mines or along coal haul routes will be protected from exposure to excessive mining-related noise by the Selected Action. If sensitive receptors are expected to experience an L_{eq} of 70 dBA from coal haul truck traffic, a site-specific review would be performed to determine more accurately what noise levels will be generated by the proposed activity. Mitigative measures will be required to reduce noise emissions exceeding an L_{dn} of 73 dBA or an L_{eq} of 70 dBA at sensitive receptors, thereby protecting them from exposure to excessive mining-related noise levels.

The Selected Action will protect the cultural resources (historic, archaeologic, and paleontologic sites) of the Eastern Kentucky Coal Field from possible adverse impacts of coal mining operations by requiring the permit applicant to obtain clearance from the Kentucky SHPO and/or OSA. If the SHPO or OSA determines that the permit area contains resources that are listed on the National Register of Historic Places or are eligible for inclusion on the National Register and that coal mining operations are likely to have significant adverse impacts on the resource, mitigative measures will be developed to preserve the resource as a condition to permit issuance. USEPA will work closely with the SHPO and/or OSA in the review and protection of cultural resources.

The sensitive resources described above are reviewed and the degree of impact assessed by using the Resource Threshold Criteria. In addition, local, State, and Federal agency review comments as well as review comments from the general public provide for the identification of possible significant impacts not otherwise addressed by USEPA. Where significant adverse impacts are determined likely to occur, they can be resolved by the application of permit conditions that mitigate the adverse impact or the preparation of an EID and/or EIS which describes mitigative measures to be taken in the form of feasible alternatives.

USEPA has determined that some environmenal resource areas such as floodplains, steep slopes, transportation networks, etc. are adequately protected from the adverse impacts of coal mining by the regulations of other Federal or state agencies. To avoid duplicating the efforts of these other agencies, USEPA will not perform its own review of these resources. Instead, USEPA will rely on the review and permit requirements of the appropriate agency to fulfill its responsibilities.

In summary, the Selected Action provides an environmental review mechanism that can identify significant adverse impacts early in the review process so that a detailed, site-specific investigation can be instigated prior to permit approval. Those projects for which no significant adverse impacts are identified in the initial review can be permitted rapidly while still providing an adequate level of environmental protection.

7.2 TEMPORAL EFFECTS

The implementation of the Selected Action will streamline the permit review process, thereby reducing the time required to process the NPDES permit application considerably. Both the permit applicant and USEPA will benefit from this time savings. For example, if no significant environmental impacts are encountered during the initial review, the final NPDES permit could be issued in approximately 60 days. If the initial RTC are triggered but further investigation indicates the impacts are not significant or the applicant agrees to accept appropriate mitigative measures and permit conditions, approximately 80 days would be required for final permit issuance. In cases where an EID and/or EIS is required, permit issuance could require from 165 to more than 300 days depending on the complexity of the issues to be resolved. The vast majority of permits will likely be issued within the 60 to 80 day time frame.

7.3 USEPA MANPOWER REQUIREMENTS

The manpower requirements necessary for USEPA to fully implement the Selected Action are moderate. Based on an estimated 350 permit applications per year, approximately 1.5 additional USEPA manyears of effort would be needed to adequately implement the review process. This compares favorably to the estimated 10 manyears that would be required to perform NEPA compliance reviews utilizing conventional methods.

7.4 FINANCIAL IMPACTS TO USEPA AND PERMIT APPLICANTS

The costs of implementing the Selected Action would be borne by both USEPA and permit applicants. Based on the estimated 350 NPDES permit applications to be processed annually, USEPA would expect to spend an estimated $320,000 for the preparation of EIS's not prepared under the third-party system. The permit applicants as a group are estimated to require a total financial commitment of approximately $2.2 million per year under the Selected Action. This estimated cost to applicants would be required to initially supply data for USEPA review, to obtain additional data, and to prepare EID's and EIS's as needed. This $2.2 million cost to New Source NPDES permit applicants is relatively small when compared to the costs associated with obtaining interim mining permits or the revenues that are derived from the sale of coal mined in eastern Kentucky. It is estimated that up to $17 million would be required to provide mining plans, special studies, and other information necessary to obtain mining permits for these New Source mines from BSMRE under the interim OSM program. Revenues from the sale of coal from eastern Kentucky mines would likely exceed $300 billion annually at current coal prices. The costs associated with obtaining New Source NPDES permits in eastern Kentucky are relatively small (.2%) when compared to the revenues generated by the sale of coal or the costs of obtaining mining permits.

8.0 HISTORY OF PUBLIC PARTICIPATION

To assist in the identification of issues pertinent to the preparation of this document, USEPA established a Review Committee comprised of representatives from various Federal and State agencies, the coal mining industry, universities, and conservation groups (Table 8.0-1). Review committee meetings were held prior to project commencement and on 24 September 1980 and 19 February 1981. The purpose of these meetings was to provide a forum where project personnel and committee members could discuss, in detail, the various NEPA compliance strategies and related implementation procedures. In particular, participants were invited to comment on the proposed Resource Threshold Criteria. All comments received were considered by USEPA and, where appropriate, incorporated into this document.

In addition to the Review Committee USEPA solicited comments from other public agencies, private corporations and environmental groups (Table 8.0-1) through numerous phone conversations and correspondence. Similarly, all substantive recommendations received from these organizations were considered during the preparation of this document.

Table 8.0-1. Public agencies and private organizations consulted during the preparation of the Eastern Kentucky Coal Field Areawide EIA.

FEDERAL

- US Fish and Wildlife Service
- US Office of Surface Mining*
- US Forest Service
- US Geological Survey

STATE

- Kentucky Nature Preserves Commission*
- Kentucky Department for Natural Resources and Environmental Protection*
  - Division of Water*
  - Division of Air Pollution Control
  - Bureau of Surface Mining Reclamation and Enforcement*
  - Office of Special Projects
  - Office of Policy and Program Analysis*
- Kentucky Geological Survey*
- Kentucky Department of Local Government
- Kentucky Department of Transportation
- Kentucky Department of Fish and Wildlife Resources*
- Kentucky Department of Community and Regional Development
- State Historic Preservation Officer
- Kentucky Office of State Archaeology

PRIVATE

- Kentucky Audubon Society*
- Appalachian Coalition*
- Appalachian Research and Defense Fund*
- Kentucky Wesleyan College
- Kentucky Coal Association*
- MAPCO Coals, Inc.*
- US Steel Corp.*
- Peabody Coal Company
- General Energy Corporation*

*Review Committee Members

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APPENDIX A

The following pages contain benefit and cost analyses (applicant and EPA) for each resource area. Each analysis includes a description of the impact of coal mining activities on the resource, technical alternatives, existing regulations, NEPA compliance alternatives, an evaluation and a recommendation.

The threshold criteria for each resource area are used to streamline the NEPA process under two of the four strategies, the Areawide-Individual and Areawide-Subareawide-Individual strategies. These analyses have been prepared to aid in decisions weighing the environmental benefits inherent in protecting a certain resource against the associated costs.

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SURFACE WATER

DESCRIPTION OF IMPACT:

The quality of surface water is affected by mining activities through the introduction of iron and manganese concentrations, acid mine water and sediment loads. The erosion of exposed soil, coal refuse piles, and coal storage piles and overflow from sedimentation ponds during storm events can result in the release and transport of sediment, toxic substances and other water quality reducing elements to streams. The increased sediment loads, toxic wastes, acid mine drainage, and high dissolved solids decrease stream water quality and can cause (1) a reduction, alteration in composition, or elimination of aquatic life, (2) an alteration, reduction, or elimination of water use opportunities for industrial processes and domestic consumption, and/or (3) a decrease in waste assimilative capacity.

Mining activities in Eastern Kentucky have a great potential to produce impacts on threatened or endangered species, species of special concern, and species of undetermined status. Direct removal of stream segments may result in elimination of benthic organisms, fish, and microscopic plant life. Replacement of stream segments by sediment ponds also reduces the quality of aquatic life. Potential impacts include changes in groundwater inflow and soil moisture levels, both of which may result in direct impacts on wetland vegetation or changes in species composition. Sedimentation generally has the more significant potential impact on aquatic life due to increased erosion from mined areas and coal washing facilities. Acid mine drainage may cause additional stress on the aquatic life of receiving streams by lowering the pH of receiving waters and increasing the release of sulfur by iron and sulfur bacteria.

It is possible that adverse impacts on aquatic life and water supply sources could occur as far as five miles downstream from a coal mining discharge.

TECHNICAL ALTERNATIVES:

There are several alternatives available to mitigate these impacts:

- At source controls to prevent or reduce the rate of pollution formation (e.g. surface land reclamation, drainage diversions, impoundments, refuse pile reclamation, revegetation);

- Treatment of polluted water before discharge (e.g. chemical neutralization of acid mine drainage);
- Techniques for dispersing and diluting released polluted waters (e.g. scheduling of volumes, rates, times, and locations);
- Techniques for isolating polluted water;
- Requirements for more intensive aquatic water quantity and water quality monitoring to document compliance with EPA/NPDES requirements and to identify trends toward adverse impacts.

EXISTING REGULATIONS:

Many of the provisions under both the interim and permanent SMCRA programs are designed to protect hydrologic balance, i.e. water quality and quantity and the location of surface channels and streams. Coal mining operators not only face performance standards concerning mining methods, but also must initiate monitoring systems to prove they are not adversely affecting the hydrologic balance. Regular monitoring reports are required. Several general methods are established for protecting hydrologic balance, such as land shaping, diverting runoff, planting vegetation, regulating channels, mulching, and protecting water from waste. The regulations also address the diversion of streams and surface runoff, channel lining, sediment control, and spoil disposal.

According to SMCRA, all surface drainage from the disturbed area must pass through a sedimentation pond or series of ponds before leaving the area. The regulations establish both design and performance standards for sedimentation ponds, however, many of these requirements are being challenged in the courts.

The most stringent effluent limitations for surface runoff are the New Source Performance Standards (NSPS) established for the coal mining industry under the Clean Water Act administered by EPA though the NPDES permitting process. The standards are presently applied to discharges of water from the active mining areas. Discharges from upgradient diversion ditches and from regraded and successfully reclaimed areas are not presently subject to the NSPS if their runoff is separated from the discharge of the active mining areas. The NSPS and water quality standards consider protection of general aquatic habitat, but do not take into consideration sensitive or unique downstream biological resources or identified public water supply intakes. They do specifically regulate certain parameters of the point source discharge. These standards do not address reliability of treatment processes. The EPA Regional Administrator may also impose more stringent discharge limitations than the NSPS for stream segments where they are considered necessary to protect sensitive aquatic ecosystems, designated surface water use, or existing high quality water.

The Commonwealth of Kentucky has established minimum criteria to prevent the degradation of surface waters, which criteria include prevention of substances which injure aquatic or human life. However, no formal procedure is prescribed including standards for protecting sensitive or unique aquatic life.

Significant impacts, therefore, could potentially occur with the (1) reduction, alteration in composition or elimination of sensitive or unique aquatic life and (2) reduction in water use opportunities for domestic consumption or industrial processes. A single significant pollution episode as far as five miles upstream from a sensitive area could destroy or significantly affect these resources.

ALTERNATIVES:

There are several alternatives available to EPA through the NEPA process to address this potential impact. These options are:

Areawide FONSI - EPA could attempt to argue that the surface water impacts of coal mining and preparation operations are not significant. EPA could argue that existing Commenwealth, EPA and SMCRA requirements fully address and mitigate potential impacts. This argument can be made for nonsensitive and nonunique resources. However, impacts of coal mining on receiving streams can significantly affect downstream sensitive or unique biological resources and/or identified public water supply intakes. This impact would be difficult to be argued to be insignificant.

Significant But Not Mitigatable - EPA could argue that although the impact is significant, there are not technical or institutional means to mitigate the impact. However, technical solutions are available that are relatively inexpensive to the applicant and would help significantly mitigate impacts on sensitive or unique aquatic life and water use opportunities.

General Conditioning - A general condition such as the following could be used to mitigate impacts by inclusion in every new source NPDES permit:

The applicant shall ensure that mining discharges will not adversely affect any of the following resources located within five miles downstream of proposed operations: (1) designated or proposed domestic water supplies, (2) designated or proposed coldwater aquatic habitats, (3) designated or proposed Outstanding Resource Waters of the Commonwealth (which category includes but is not limited to (a) Federally listed or proposed species in danger of extinction or threatened with endangerment (b) Sensitive Aquatic Ecosystems identified by the Kentucky Nature Preserves Commission, and (c) high or moderate water quality streams identified by KNPC).

Areawide-Individual - An individual review for each project employing the resource threshold criteria concept could analyze impacts utilizing the following criteria/levels. With this alternative, should a significant impact be identified, appropriate technical mitigation measures, such as those listed above could be selected on a case by case basis. The five mile distance from the proposed discharge is used simply as an outside limit for possible significant impacts on resources located within the segment.

Level I   Receiving stream segments within 5.0 miles downstream of proposed discharge:

- designated or proposed for designation as domestic water supply use, or
- designated or proposed for designation as coldwater aquatic habitat use, or
- designated or proposed for designation as an Outstanding Resource Water of the Commonwealth, or
- identified as a Sensitive Aquatic Ecosystem by KNPC, or
- likely to be inhabited by a Federally listed or proposed species in danger of extinction or threatened with endangerment identified by KNPC, or
- identified as a high or moderate water quality stream by KNPC.

Level II   Proposed coal mining operations are likely to have a significant adverse impact on the characteristics of the stream segments listed in the Level I criterion which makes them unique, outstanding, or otherwise significant.

Level III Proposed coal mining operations will have a significant adverse impact on the characteristics of the stream segments listed in the Level I criterion which makes them unique, outstanding, or otherwise significant which has not or cannot be mitigated.

Standard Conditioning - A standard condition such as the following could be used to mitigate impacts for those mining operations meeting or exceeding the Level I criteria described above.

A surface water monitoring program will be conducted to provide water quality and quantity data sufficient to allow a detailed impact analysis on the (insert identified sensitive resource) located downstream from the mining discharge. Monitoring will be conducted at a minimum at the mining effluent discharge point(s) and at the location of the (insert identified sensitive resource). Monitoring data will be provided quarterly to EPA, Water Management Division, Region IV, to the Kentucky Department of Natural Resources (Divisions of Water and Fish and Wildlife) and the Kentucky Nature Preserves Commission. Should adverse impact be detected the applicant shall initiate measures acceptable to EPA and the Commonwealth to avoid or mitigate such impacts.

EVALUATION:

Discharges to surface water have the potential to significantly impact public water supply intakes and sensitive or unique aquatic ecosystems. There are measures that can be taken to mitigate these impacts for the East Kentucky Coal Field. The General Conditioning, Areawide-Individual, and Standard Conditioning alternatives each have cost, environmental, timing and flexibility differences.

EPA's mandate in this area is clear as evidenced by Section 302 of the Clean Water Act which states that the Regional Administrator may impose more stringent discharge limitations than the New Source Performance Standards for stream segments where such standards are considered necessary to protect sensitive aquatic ecosystems, designated surface water use, or existing high quality water.

In terms of environmental benefits, the General Conditioning approach has potential benefits since every NPDES permit would include a condition requiring control of adverse impacts on sensitive or unique aquatic ecosystems and public water supply intakes. However, it would be very difficult to enforce the condition without having identified and having surface water data collected for specific sensitive resources. It is probable that applicants would ignore this condition, since no specific information would be available to EPA. Therefore, it is doubtful that this potential for environmental benefits would be realized. This option has the least likelihood of realizing environmental benefit.

Under the Standard Conditioning alternative permit conditions would be applied only to those operations with identified sensitive resources located within five miles downstream from the discharge(s). Therefore, it is less probable that applicants will ignore the conditions. Greater environmental benefits should be possible. However, it is very difficult to draft a standard permit condition appropriate to mitigate impacts on the wide variety of sensitive aquatic habitats and water supply sources identifiable in the East Kentucky Coal Field. For this reason, the environmental benefits to be realized from the Standard Conditioning alternative are not as great as those possible under the Areawide-Individual approach. The latter provides for individual reviews, including identification of the sensitive resource, collection and analysis of water quality data and evaluation of potential means to avoid or minimize possible impacts prior to imposition of a permit condition. This option has the greatest likelihood of realizing environmental benefit.

While all of the alternatives could be argued to comply with the statutory requirements of NEPA, they differ in their potential for challenge through adjudicatory hearings. The sensitive resources deserving protection (e.g. habitats of endangered species and public water supply intakes) are not widespread throughout the Coal Field. Under the General Conditioning approach, challenges to conditions might be expected for which EPA would have little site-specific documentation to support the condition. The sensitive resources are identified under the Standard alternative prior to conditioning, however, the significance of the impact is not assessed due to the lack of water quality data. Therefore, it is still likely that using this alternative, operations would be conditioned inappropriately. The Areawide-Individual alternative appears to be the most implementable of the three.

Processing time requirements are zero under the General Conditioning alternative. With the Standard Conditioning alternative it would take approximately five days to review the initial environmental information and advise the Water Management Division whether or not to include the standard condition in the NPDES permit. Twenty days would be required to process an application under the Areawide-Individual alternative to make a Level II decision (i.e. review additional information submitted by the applicant) and an additional 30 days to review an EID, if required, and formulate a decision. These time frames do not consider applicant response times, which could include 60 days to prepare an EID. Over 300 days may be requirewd to prepare an EIS.

The following analysis considers specific EPA manpower requirements and costs and mining applicant costs for this resource area.

APPLICATIONS TRIPPING THRESHOLD LEVELS FOR SURFACE WATER (annual estimate)

Surface Mines	LI 145	LI 35	LII 10	LIII 3
Underground Mines	LI 105	LI 15	LII 5	LIII 1
Prep Plants	LI 20	LI 30	LII 8	LIII 1
TOTAL	270	80	23	5

EPA MANPOWER AND COST (annual manpower based on above estimations)*

Initial Review	175	hours
Review of additional questions	80	hours
Review of EIDs	552	hours
Preparation of EISs	824	hours
Total Work Hours	1631	
EIS Costs	$ 100,000	

APPLICANT COST (Annual cost based on above estimations)*

Initial information	$ 35,000	(100 x 350)
Additional questions	160,000	(80 x 2000)
EIDs	90,000	(18 x 5,000)
EISs	405,000	

(4 x 100,000 + 1 x 5,000 = 405,000)

TOTAL $690,000

*Assumptions: (1) An EID will cost an average $5,000 and require 24 hours of EPA review time, (2) 80% of the EISs will be "third party" (i.e. no applicant EID preparation and a $100,000 applicant cost for preparation of the third party EIS), (3) 20% will require applicant preparation of the EID with EPA responsibility for the EIS, at a cost to EPA of $100,000, (4) EPA manpower requirements are 160 hours to process third party EISs and 184 hours for the EID/EIS combination.

The General Conditioning alternative would cost the applicant nothing in terms of data supplied to EPA, since none would be required. The general permit condition described above would be included as a matter of course in each NPDES permit by the Region IV Water Management Division and, therefore, require no additional manpower. The Standard Conditioning alternative would require 175 EPA workhours of effort to review the initial environmental information and advise the Water Management Division to include the standard condition. The cost to mining applicants would be approximately $35,000 per year to supply the Level I information. The EPA workhours required to handle the Areawide-Individual alternative would be greater, an estimated 1631 workhours and a potential EIS cost of $100,000.

Applicants would probably spend $690,000 annually responding to requests for additional information, and preparing the estimated EIDs and EISs, including the initial information.

The Areawide-Individual alternative is the most flexible in terms of providing the appropriate mitigation measures and the likelihood that these measures would be implemented for the proposed mining operation. The Standard Conditioning and General Conditioning approaches would be evaluated a distant second and third respectively.

Duplication of effort with other state and Federal laws and regulations has been taken into consideration prior to the development of any of the above described alternatives. However, due to its individual review the Areawide-Individual analysis would be able to prepare mitigation measures considering the most current existing regulations. This additional coordination would not be immediately available under the General Conditioning and Standard Conditioning alternatives.

RECOMMENDATION:

The Areawide-Individual alternative is recommended as the most appropriate approach to mitigate significant surface water impacts in the East Kentucky Coal Field. It is more costly to EPA and to the applicant than the other two alternatives, yet it provides a much greater degree of environmental benefit. This benefit is felt to outweigh the additional costs involved and the additional processing time requirements due to the significance of the resources and potential impacts. Further, in comparison to the General and Standard Conditioning alternatives, this approach would likely result in better protection against specific adverse impacts, is more flexible, would result in a greater ability to legally defend any conditions, and allows for coordination of effort with other regulations.

SENSITIVE ECOSYSTEMS

DESCRIPTION OF IMPACT:

Sensitive Ecosystems include areas so identified by KNPC including areas determined to be inhabited by Federally listed or proposed species in danger of extinction or threatened with endangerment and designated by USFWS. The construction and operation of coal mines, haul roads and preparation plants can cause adverse impacts on sensitive biological ecosystems of the Eastern Kentucky Coal Field. Direct effects may include elimination of terrestrial vegetative and wildlife habitats on mine sites (especially significant for strip mines). Mining or major human activity in proximity to certain sensitive systems may also cause adverse effects from noise, dust and other related impacts.

TECHNICAL ALTERNATIVES:

There are several alternatives available to mitigate this impact.

- Relocate or prohibit mining activities to avoid impacts on sensitive areas.
- Alter the rate or schedule of mining activities to minimize adverse impacts to nearby Sensitive Ecosystems.
- Establish buffer zones around sensitive resource areas.
- Implement prompt reclamation and revegetation of disturbed land.
- Mine during periods of the year when the ecosystem is less sensitive to alteration or impact.

EXISTING REGULATIONS:

Existing regulations protecting Sensitive Ecosystem resources, including endangered species, relate to direct, on-site impacts. Very few provisions have been established requiring the consideration of impacts to resources outside proposed permit areas.

Both interim and permanent SMCRA programs provide detailed revegetation requirements, including timing of revegetation, mulching and use of introduced species. The permanent SMCRA regulations also require that the best available mining technology be used to minimize the on-site disturbance of sensitive biological resources. Reclamation of the site must offer the same or better protection to terrestrial ecosystems as existed before the mining operations. Yet, surrounding biological habitats and potential impacts are not considered. The protection of sensitive biological areas that would be significantly adversely impacted if mined is provided by SMCRA through the process of designation of "lands unsuitable" for mining (30 CFR762 through 769), a segment of the permanent program. However, a recent Federal court action has decided that SMCRA may not require detailed information concerning fish and wildlife habitats in its permanent program applications. States may request such data, but it appears to be the intention of Kentucky that its program will be no more stringent than Federally required.

The Endangered Species Act prohibits Federal agencies from jeopardizing species in danger of extinction or threatened with endangerment and from adversely modifying habitats essential to their survival. If consultation with the US Fish and Wildlife Service reveals that an action will affect a listed species or habitat adversely, acceptable mitigation measures must be undertaken or the proposed action terminated.

The greatest level of state protection afforded Sensitive Ecosystems is provided by the Nature Preserves Act. Areas determined to be of particular ecological importance or value are designated as nature preserves and as such preempt mining activities within their boundaries. However, at this time no preserves have been officially designated by the Commonwealth. The Kentucky Nature Preserve Commission has performed an inventory of ecologically, biologically, and geologically significant areas in the Eastern Kentucky Coal Field. Animal and plant species listed include; (1) those recognized or proposed as Federally threatened; (2) those which may have recently been extirpated from Kentucky; (3) those whose populations and/or distribution are decreasing to levels where extinction is possible; (4) those whose occurences in Kentucky represent distributional limits; and (5) those which in the opinion of experts warrant special consideration.

None of the described programs provides a mechanism by which the applicant is to supply biological data for the proposed mining site. Impacts on Sensitive Ecosystems on adjacent lands are not even discussed under SMCRA. While KNPC has inventoried Sensitive Ecosystems, there is no accompanying regulatory mechanism to protect these areas, other than the Commonwealth Nature Preserves Act. SMCRA does not require identification of these resources. Significant impacts could be expected without an established method to identify Sensitive Ecosystems in close proximity to mining operations and provide control measures.

ALTERNATIVES:

There are several alternatives available to EPA through the NEPA process to address this potential impact. These options are:

Areawide FONSI - The impacts of coal mining and related activities on Sensitive Ecosystems, including endangered species, could be significant, resulting in the perturbation or destruction of these resources. These areas and such species have been identified within the Coal Field. This impact could not be argued to be insignificant.

Significant But Not Mitigatable - EPA could argue that although the impact is significant there are not technical or institutional means to mitigate the impact. However, mitigative measures are available to protect these resource areas from coal mining impacts.

General Conditioning - A general permit condition such as the following could be used to attempt to mitigate impacts on sensitive resources by inclusion in every new source NPDES permit:

> The applicant shall ensure that mining operations will not adversely impact any of the following resources: (1) a Sensitive Ecosystem identified by KNPC, or (2) an area identified by KNPC as likely to be inhabited by a Federally listed or proposed species in danger of extinction or threatened with endangerment and designated by USFWS.

Areawide-Individual - An individual review for each project employing the resource threshold criteria concept could analyze possible impacts to Sensitive Ecosystems. With this approach, appropriate technical mitigative measures could be selected on a case by case basis when significant impacts are identified.

Level I	Surface disturbance caused by coal mining operations proposed within 2,000 feet of (1) a Sensitive Ecosystem identifed by KNPC or (2) an area identified by KNPC as likely to be inhabited by Federally listed or proposed species in danger of extinction or threatened with endangerment as designated by the U.S. Fish and Wildlife Service.
Level II	Surface disturbance caused by proposed coal mining operations is likely to have a significant adverse impact on the characteristics of the habitat or ecosystems defined by the Level I criterion which makes the habitat unsuitable for those sensitive ecosystems.

Level III Surface disturbance by proposed coal mining operations will have a significant unmitigated adverse impact on the characteristics of the habitat or ecosystems defined by the Level I criterion which makes the habitat unsuitable for those sensitive ecosystems.

Standard Conditioning - A standard condition such as the following could be used to mitigate impacts for those mining operations meeting or exceeding the Level I criteria described above:

> The applicant shall establish buffer zones around Sensitive Ecosystems. Where ecosystems cannot be buffered from adverse mining impacts, mining activities shall be relocated. Mining activities shall be phased to minimize adverse impacts to nearby ecosystems and revegetation on-site shall follow SMCRA procedures. A monitoring program will be conducted to provide data sufficient to allow a detailed impact analysis. Monitoring data will be provided quarterly to EPA, Water Management Division, Region IV and to the Kentucky Nature Preserves Commission. Should adverse impacts be detected, the applicant shall initiate measures acceptable to EPA and KNPC to avoid or mitigate such impacts.

EVALUATION:

Coal mining has the potential to significantly impact Sensitive Ecosystems in East Kentucky through direct elimination or habitat pollution. This impact is mitigatable. The General Conditioning, Areawide-Individual, and Standard Conditioning alternatives each have cost, environmlental, timing and flexibility implications.

EPA's mandate to protect endangered species is clear. The Endangered Species Act requires certain procedural activities on the part of the agency. Through its NEPA responsibility EPA is required to evaluate the environmental consequences of its actions on the existing environment. One element of the existing environment is specifically stated to be "plant and animal communities which may be affected, especially those containing threatened or endangered species". It is evident that it is EPA's responsibility to bring impacts on Sensitive Ecosystems to the attention of the public.

In terms of environmental benefits, the General Conditioning approach has potential since every NPDES permit would include a condition requiring control of adverse impacts. However, it would be very difficult to enforce the condition withouthaving identified and having data collected for specific Sensitive Ecosystems. It is probable that applicants would ignore this condition, since no specific information would be available to EPA. Therefore, it is doubtful that this potential for environmental benefits would be realized. This option has the least likelihood of realizing environmental benefit.

The Standard Conditioning alternative probably has more potential for realizing environmental benefits than the General Conditioning alternative. Permit conditions would be applied only to those operations where Sensitive Ecosystems are identified on the proposed permit area or within 2,000 feet. Although not as inclusive as the General Conditioning alternative, Standard Conditoning would be environmentally conservative in comparison to the Areawide-Individual approach (i.e. mitigation measures would be required of some operations which would probably not be required after an individual analysis).

The Areawide-Individual would require mitigation only of those operations with potential for significant impact on Sensitive Ecosystems. The likelihood is greatest that the impact would be mitigated under this more detailed investigation procedure. Applicants would be required to investigate alternatives and address mitigation more carefully. This option has the greatest likelihood of realizing environmental benefits.

While all three of the alternatives could be argued to comply with the statutory requirements of NEPA, they differ in their potential for legal challenge through adjudicatory hearings. Mining impacts on Sensitive Ecosystems have the potential to be significant as described above, however, these ecosystems are not widespread throughout the Coal Field.

Under the General Conditioning approach, challenges to conditions might be expected for which EPA would have little site-specific documentation to support the condition. While this is also a potential problem under the Standard Conditioning alternative, the likelihood is not as great since some site-specific factors would have been considered prior to conditioning. The Areawide-Individual alternative with its individual analysis creates the least potential for losing such challenges and would likely result in the greatest level of mitigation. It appears to be the most implementable of the three alternatives.

Processing time requirements are zero under the General Conditioning alternative. The Standard Conditioning approach would take approximately five days for review of the initial environmental information and notification to the Water Management Division to include the standard condition. Twenty days would be required to process an application under the Areawide-Individual alternative to make a Level II decision and an additional 30 days to review an EID, if required, and formulate a decision. These time frames do not consider applicant response times, which could include 60 days to prepare an EID. Over 300 days may be required to prepare an EIS.

The following analysis considers specific EPA manpower requirements and costs and mining applicant costs for this resource area.

APPLICATIONS TRIPPING THRESHOLD LEVELS FOR SENSITIVE ECOSYSTEMS (annual estimate)

Surface Mines	LI	176	LI	4	LII	1	LIII	0
Underground Mines	LI	120	LI	0	LII	0	LIII	0
Prep Plants	LI	49	LI	1	LII	0	LIII	0
TOTAL		345		5		1		0

EPA MANPOWER AND COST (annual manpower based on above estimations)*

Initial Review	175	hours
Review of additional questions	5	hours
Review of EIDs	24	hours
Preparation of EISs	0	hours
Total Work Hours	204	
EIS Costs	$ 0	

APPLICANT COST (Annual cost based on above estimations)*

Initial information	$ 35,000	(100 x 350)
Additional questions	5,000	(1,000 x 5)
EIDs	5,000	(1 x 5,000)
EISs	0	
TOTAL	$ 45,000	

*Assumptions: (1) An EID will cost an average $5,000 and require 24 hours of EPA review time, (2) 80% of the EISs will be "third party" (i.e. no applicant EID preparation and a $100,000 applicant cost for preparation of the third party EIS), (3) 20% will require applicant preparation of the EID with EPA responsibility for the EIS, at a cost to EPA of

$100,000, (4) EPA manpower requirements are 160 hours to process third party EISs and 184 hours for the EID/EIS combination.

The General Conditioning alternative would cost the applicant nothing in terms of data supplied to EPA, since none would be required. The general permit condition described above would be included as a matter of course in each NPDES permit by the Region IV Water Management Division and, therefore, require no additional manpower. The Standard Conditioning alternative would require 175 EPA workhours of effort to review the initial environmental information and advise the Water Management Division to include one or both of the standard conditions. The cost to mining applicant would be approximately $35,000 per year to supply the Level I information. The EPA workhours required to handle the Areawide-Individual alternative would be greater, an estimated 204 workhours and a potential EIS cost of $0. Applicants would probably spend $45,000 annually responding to requests for initial information, additional information, and preparing the estimated EIDs and EISs.

The Areawide-Individual alternative is the most flexible in terms of providing the appropriate mitigaton measures and the likelihood that these measures would be implemented for the proposed mining operation. The Standard Conditioning and General Conditioning approaches would be evaluated a distant second and third respectively.

Duplication of effort with other state and Federal laws and regulations has been taken into consideration prior to the development of any of the above described alternatives. However, due to its individual review the Areawide-Individual analysis would be able to prepare mitigation measures considering the most current existing regulations. This additional coordination would not be immediately available under the General Conditioning and Standard Conditioning alternatives.

RECOMMENDATION:

The Areawide-Individual alternative is recommended as the best approach that can be utilized to protect Sensitive Ecosystems in terms of environmental benefits. Site specific data would be used to determine possible impact and to develop specific mitigative measures. This approach would result in a greater ability to legally defend any conditions and allows for coordination of effort with other regulations. The Areawide-Individual approach is also the only alternative that could satisfy EPA's NEPA requirements for the protection of Federally listed threatened and endangered species and habitats. It is more costly to EPA and to the applicant than the other two alternatives, yet it provides a much greater degree of environmental benefit. This benefit is felt to outweigh the additional costs involved and the additional processing time requirements due to the significance of the resources and potential impacts.

GROUNDWATER

DESCRIPTION OF IMPACT:

Coal mining in the Eastern Kentucky Coal Field can impact the quantity and quality of groundwater resources. Underground mining can cause the formation and the migration of acid mine drainage (AMD) into the groundwater aquifer. Dewatering of underground mines can cause the loss of private or public wells. Leachate from refuse and storage piles at preparation plants can enter groundwater aquifers. The potential for impact continues beyond the operating life of the proposed operations where air and water access is provided to shale or other AMD producing strata. While there is a potential for impact on groundwater from surface mining, this impact does not appear to be significant.

The contamination or loss of groundwater resources by coal mining activities can adversely affect users of this resource. Public and private groundwater users can lose their source of potable water through the introduction of AMD into groundwater aquifers or dewatering unless a natural barrier (aquitard) exists between the source of the contamination and the well.

TECHNICAL ALTERNATIVES:

There are several alternatives available to mitigate this impact.

- Mine Seals - Mine seals prevent the passage of air into abandoned underground mines. Dry seals can be used where no hydraulic head is likely to form behind the seal. Hydraulic seals are used to dam up water behind them and flood the mine, keeping out oxygen.

- Well Dewatering - Dewatering a mine by using wells curtails the flow of groundwater into the mine, thereby reducing contact with acid-producing minerals.

- Isolation - Acid forming overburden or spoil can be isolated from oxygen contact by burying the material. The spoil should be compacted and buried deep enough to prevent exposure to air.

- Neutralization - Acid producing overburden and spoil can be neutralized by mixing with or otherwise introducing neutralizing material such as limestone, lime, or alkaline strata.

- Replacement - A contaminated or dry well can be replaced.

EXISTING REGULATIONS:

The interim and permanent SMCRA regulations provide a groundwater protection program which requires coal operators to replace any wells contaminated or depleted by mining activities. The responsibility rests with the well owner to prove that contamination or depletion has resulted from the mining operation. The regulations are not designed to consider the possible impacts of the proposed operation to off-site wells prior to the commencement of mining. However, the interim program application does require that the applicant provide a groundwater monitoring plan for his mining operation. This plan should include information on groundwater levels, infiltration rates, subsurface flow, storage characteristics and water quality. Although depletion of water quantity is an inconvenience, loss of water or pressure is a recognizable effect, and an alternate source could be provided for a private well. Provisions of alternate sources for a public well may pose a more significant problem. However, water quality changes may not be as discernable. The potential health effects of water quality degradation highlight the significance of this impact.

The Safe Drinking Water Act addresses two aspects of groundwater water quality, underground injection of wastes and controls of public water supplies. The Act gives EPA enforcement powers in cases where contaminants are present or are likely to enter a public water system and may present an imminent and substantial danger to the public health and which the appropriate state and local authorities have not acted upon. Sludge produced from the treatment of AMD is the only waste from coal mining activity that currently falls under EPA's definition of hazardous waste.

Significant impacts can potentially occur due to groundwater supply loss or contamination by underground coal mining, AMD treatment sludge disposal and preparation plant activities in Eastern Kentucky.

ALTERNATIVES:

There are several alternatives available to EPA through the NEPA process to address this potential impact. These options are:

Areawide FONSI - Groundwater impacts from coal mining activities could be argued to be acceptably addressed by existing regulations. Water wells in the vicinity of mining operations that become contaminated by AMD or are depleted must be replaced by the applicant. Monitoring is now required somewhat routinely to detect any adverse impacts.

Significant But Not Mitigatable - EPA could argue that although there is potential for significant impact, there are not technical or institutional means to mitigate the impact. In the case of groundwater, however, technical solutions are available to the applicant and could help mitigate the impact of groundwater contamination.

General Conditioning - A general permit condition such as the following could be used to attempt to mitigate groundwater impacts by inclusion in every new source NPDES permit:

> The applicant shall assure the protection of groundwater quality at public supply wells and private water supply wells.

Areawide-Individual - An individual review for each project employing resource threshold criteria could analyze groundwater impacts utilizing the following criteria levels. With this alternative, should a significant impact be identified, appropriate technical mitigation measures could be selected on a case by case basis.

Level I Private water supply wells, except those used solely by the applicant, occur within 2,000 feet of a proposed underground permit area which has the potential to produce AMD, an AMD treatment sludge disposal area or a preparation plant coal storage or refuse disposal area, and no barrier is known to preclude hydraulic connection between a potential pollution source and producing aquifers, or

Public water supply wells occur within one mile of a proposed underground permit area, an AMD treatment sludge disposal area, or a preparation plant coal storage or refuse disposal area, and no barrier is known to preclude hydraulic connection between a potential pollution source and producing acquifers.

Level II There is likely to be a significant adverse impact on private or public water supply wells, except those used solely by the applicant.

Level III Proposed coal mining operations will have an unmitigated significant adverse impact on the public or private water supply wells, except those used solely by the applicant.

Standard Conditioning - Standard conditions such as the following could be used to mitigate impacts for those mining operations meeting or exceeding the Level II criteria described above. For underground mining operations the condition would state:

> Mine seals, either dry seals or hydraulic seals, will be installed in all mine shafts to prevent the formation of acid mine drainage.

For preparation plants the condition would state:

> Acid forming overburden, spoil, and refuse will be isolated from oxygen contact by compaction and burial and/or by neutralization with basic material.

EVALUATION:

Groundwater contamination and depletion has the potential to be a significant impact from underground coal mining and preparation plant activities in Eastern Kentucky. This impact is mitigatable. The General Conditioning, Areawide-Individual, and Standard Conditioning alternatives each have cost, environmental, timing and flexibility implications.

EPA's mandate to protect underground public drinking water supplies is clear as evidenced by the Safe Drinking Water Act described above.

In terms of environmental benefits, the General Conditioning approach has potential benefits since every NPDES permit would include a condition requiring control of adverse impacts. However, it would be very difficult to enforce the condition without having identified and having groundwater monitoring data collected for specific public and private wells. It is probable that applicants would ignore this condition, since no specific information wuld be available to EPA. Therefore, it is doubtful that this potential for environmental benefits would be realized. This option has the least likelihood of realizing environmental benefit.

The Standard Conditioning alternative probably has more potential for realizing environmental benefits than the General Conditioning alternative. Permit conditions would be applied only to those operations exhibiting a likelihood of signficant groundwater impacts. Although not as inclusive as the General Conditioning alternative, Standard Conditioning would be environmentally conservative in comparison to the Areawide-Individual approach (i.e. mitigation measures would be required of some operations which would probably not be required after an individual analysis).

The Areawide-Individual would require mitigaton only of those operations demonstrating the potential for significant impacts on nearby public and private wells . The likelihood is greatest that the impact would be mitigated under this more detailed investigation procedure. Applicants would be required to investigate alternatives and address mitigation more carefully. This option has the greatest likelihood of realizing environmental benefits.

While all three of the alternatives could be argued to comply with the statutory requirements of NEPA, they differ in their potential for challenge through adjudicatory hearings. Groundwater impacts have the potential to be signficant as described above. In addition, as the Coal Field becomes more populated, the potential for degrading nearby wells becomes greater.

Under the General Conditioning approach, challenges to conditions might be expected for which EPA would have little site-specific documentation to support the condition. While this is also a potential problem under the Standard Conditioning alternative, the likelihood is not as great since some site-specific factors would have been considered prior to conditioning. The Areawide-Individual alternative with its individual analysis creates the least potential for losing such challenges and would likely result in the greatest level of mitigation. It appears to be the most implementable of the three alternatives.

Processing time requirements are zero under the General Conditioning alternative. The Standard Conditioning approach would take approximately five days for review of the initial environmental information and notification to the Water Management Division to include one or both of the standard conditions. Twenty days would be required to process an application under the Areawide-Individual alternative to make a Level II decision and an additional 30 days to review an EID, if required, and formulate a decision. These time frames do not consider applicant response times, which could include 60 days to prepare an EID. Over 300 days may be required to prepare an EIS.

The following analysis considers specific EPA manpower requirements and costs and mining applicant costs for this resource area.

APPLICATIONS TRIPPING THRESHOLD LEVELS FOR GROUNDWATER (annual estimate)

Underground Mines	LI	90	LI	30	LII	1	LIII	0
Prep Plants	LI	20	LI	30	LII	3	LIII	0
TOTAL		110		60		4		0

EPA MANPOWER AND COST (annual manpower based on above estimations)*

Initial Review	175	hours
Review of additional questions	60	hours
Review of EIDs	96	hours
Preparation of EISs	0	hours
Total Work Hours	331	

EIS Costs	$ 0	

APPLICANT COST (Annual cost based on above estimations)*

Initial questionnaire	$ 280,000	(350 x 800)
Additional questions	60,000	(60 x 1000)
EIDs	20,000	(4 x 5,000)
EISs	0	
TOTAL	$ 360,000	

*Assumptions: (1) An EID will cost an average $5,000 and require 24 hours of EPA review time, (2) 80% of the EISs will be "third party" (i.e. no applicant EID preparation and a $100,000 applicant cost for preparation of the third party EIS), (3) 20% will require applicant preparation of the EID with EPA responsibility for the EIS, at a cost to EPA of $100,000, (4) EPA manpower requirements are 160 hours to process third party EISs and 184 hours for the EID/EIS combination.

The General Conditioning alternative would cost the applicant nothing in terms of data supplied to EPA, since none would be required. The general permit condition described above would be included as a matter of course in each NPDES permit by the Region IV Water Management Division and, therefore, requires no additional manpower. The Standard Conditioning alternative would require 175 EPA workhours of effort to review the initial environmental information and advise the Water Management Division to include one or both of the standard conditions. The cost to mining applicants would be approximately $280,000 per year to supply the Level I information. The EPA workhours required to handle the Areawide-Individual alternative would be greater, an estimated 331 workhours and a potential EIS cost of $0. Applicants would probably spend $360,000 annually responding to requests for initial information, additional information, and preparing the estimated EIDs and EISs.

The Areawide-Individual alternative is the most flexible in terms of providing the appropriate mitigation measures and the likelihood that these measures would be implemented for the proposed mining operation. The Standard Conditioning and General Conditioning approaches would be evaluated a distant second and third respectively.

Duplication of effort with other state and Federal laws and regulations has been taken into consideration prior to the development of any of the above described alternatives. However, due to its individual review the Areawide-Individual analysis would be able to prepare mitigation measures considering the most current existing regulations. This additional coordination would not be immediately available under the General Conditioning and Standard Conditioning alternatives.

RECOMMENDATION:

The Areawide-Individual alternative is recommended as the most appropriate approach to mitigate significant groundwater impacts in the East Kentucky Coal Field. While this alternative is slightly more costly to EPA in terms of manpower and to applicants in terms of dollars, it should result in greater environmental benefits. The mitigation measures described above in the Standard Conditioning alternative are potentially expensive and restrictive. With the Areawide-Individual approach, these measures will be required only of those operations where significant impacts on groundwater resources are likely. Additionally, this alternative does not have as great a probability of legal challenge and loss as that encountered with the other two approaches and provides for greatest flexibility.

ARCHAEOLOGIC, HISTORIC, PALEONTOLOGIC

DESCRIPTION OF IMPACT:

Coal mining activities in the Eastern Kentucky Coal Field will result in primary and secondary impacts on the cultural resources of the area. These resources may include archaeological and historic sites, properties, structures, or objects that are listed on, or determined eligible for, the National Register of Historic Places. Primary impacts on cultural resources are those adverse effects that would result from construction or operation of coal mines or related facilities, such as:

- Destruction or alteration of all or part of a site;
- Isolation from, or alteration of, the site's surrounding environment;
- Introduction of visual, audible, or atmospheric elements that are out of character with the site or would alter its setting;
- Transfer or sale of a Federally-owned site without adequate conditions or restrictions regarding preservation, maintenance, or use; or
- Neglect of a site resulting in its deterioration or destruction.

Historic and archaeological resources are highly susceptible to damage by the mining of coal, particularly by surface mining that entails an extensive modification of large surface areas. However, most of these resources are located in flat, populated floodplain areas rather than on the hillsides where surface mining occurs. Preparation plants and their sludge disposal facilities are by necessity located in the flat valleys close to transportation networks. These mining activities have the greatest potential for adversely impacting archaeological and historic resources.

TECHNICAL ALTERNATIVES:

There are several alternatives available to mitigate this impact:

- Avoidance of identified site(s) by rerouting locations of mining and construction activities;

- Recording (e.g. with photographs, measured drawings, and documentation) and relocation of site and/or recording and demolition of standing structures;
- In-place preservation of archaeological properties through the use of protective burial, barriers, or buffers and designing structures over an archaeological site in such a way as to minimize subsurface disturbances;
- Archaeological monitoring during construction of facilities; or
- Data recovery/excavation of the archaeological site conducted under a scope of work in consultation with the SHPO, the Advisory Council, and EPA.

EXISTING REGULATIONS:

Historic and archaeological resource protection is provided under several Federal mandates. EPA is subject to the requirements of the National Historic Preservation Act of 1966, as amended; the Archaeological Historic Preservaton Act of 1974; and Executive Order 11593, entitled "Protection and Enhancement of the Cultural Environment". Should coal mining activities have potential to result in adverse impacts to known historic properties or archaeological sites listed on or determined eligible for the National Register of Historic Places, Section 106 review procedures, outlined in the US Advisory Council Procedures for the Protection of Historic Cultural Properties, are required. Therefore, EPA should maintain appropriate interagency coordination in its issuance of new source permits to mining operations with potential to affect a National Register or eligible National Register site.

The State Historic Preservation Officer (SHPO) is the mandated administrator of the National Historic Preservation Act of 1966 in Kentucky. The SHPO maintains responsibility for sites on, and eligible for, the National Register. The SHPO is familiar with the amount of survey work previously conducted in the vicinity of each potential mine site or coal preparation site in Kentucky. Should there be insufficient information available regarding historic or archaeological resources of the area, the SHPO may recommend that a historic or archaeological resources survey be conducted by the applicant. Further, the SHPO is authorized to delineate the area of impact of any new source coal mine.

If significant resources are identified that will be affected by coal mining operations, several mitigation options are available. Usually, appropriate mitigation measures are decided on a case-by-case basis, and range from requirements to avoid the site(s) altogether to the planting of vegetative buffers.

SMCRA does not address archaeological resources under its interim program, however, under its permanent program the regulation provides that no new coal mines will be permitted that may affect publicly owned places that are listed on the National Register of Historic Places unless such mining is approved by the SHPO. Mining is prohibited on certain lands where mining may affect historic lands of cultural, historic, scientific, or aesthetic value.

Significant impacts, therefore, could potentially occur to historic and archaeological sites in the East Kentucky Coal Field due to coal mining operations or preparation plant construction and operation. Sites that are eligible for the National Register, but not officially listed, are especially vulnerable due to the lack of regulatory control. Since very little systematic survey work has been accomplished in Eastern Kentucky, the number of eligible sites is unknown.

ALTERNATIVES:

There are several alternatives available to EPA through the NEPA process to address this potential impact. These options are:

Areawide FONSI - EPA could attempt to argue that the impact of coal mining and preparation plants on archaeological and historic resources are not significant. However, coal mining, and preparation plants in particular, can significantly impact currently unknown historic and archaeological resources.

Significant But Not Mitigatable - EPA could argue that although the impact is significant there are not technical or institutional means to mitigate the impact. However, technical solutions are available to the applicant that can mitigate impacts on historic and archaeological resources.

General Conditioning - A general condition such as the following could be used to mitigate impacts by inclusion in every new source NPDES permit:

> Within thirty (30) days of receipt of final NPDES permit and prior to initiating surface disturbance, the applicant shall consult with the State Historic Preservation Officer (SHPO) and Office of State Archaeology (OSA) for their

determination of whether the proposed action would affect buildings or sites on or eligible for the National Register of Historic Places. The applicant shall provide such information as deemed necessary by the SHPO/OSA to make such a determination. A copy of the SHPO/OSA determination shall be provided to EPA prior to initiation of surface disturbance. Any recommendations pursuant to Section 106 of the National Historic Preservation Act shall constitute a condition of this permit.

Areawide-Individual - An individual review for each project employing the resource threshold criteria concept could analyze impacts utilizing the following criteria/levels. With this alternative, should a significant impact be identified, appropriate technical mitigation measures, such as those listed above could be selected on a case by case basis.

Level I Absence of letters indicating that no known or eligible National Register sites may be affected by the proposed operation from Kentucky Heritage Commission (State Historic Preservaton Officer, SHPO) and Kentucky Office of State Archaeology (OSA)).

Letter from Kentucky SHPO or OSA indicating a potential impact on historic, archaeologic and paleontologic resources from proposed coal mining activities.

Level II Proposed coal mining operations are likely to have a significant adverse impact on the characteristics of the resources defined in the Level I criterion. (Requires consultation with the SHPO and OSA, as appropriate).

Level III Proposed coal mining operations will have a significant unmitigatable adverse impact on the resources defined in the Level I criterion.

Standard Conditioning - A standard condition such as the following, among others, could be used to mitigate impacts for those mining operations where SHPO or OSA indicates that the proposed operation will impact a historic, archaeologic or paleontologic resource (i.e. Level I described above is triggered).

Mining and construction activities will be rerouted to avoid the identified historic, archaeologic, or paleontologic site(s). During construction, monitoring of the historic site will be conducted periodically to ensure that deterioration does not occur. All monitoring reports will be forwarded to the State Historic Preservation Officer.

EVALUATION:

Coal mining and preparation plants have the potential to significantly impact archaeological, historic and paleontologic resources in the East Kentucky Coal Field. This impact is mitigatable. The General Conditioning, Areawide-Individual, and Standard Conditioning alternatives each have cost, environmental, timing and flexibility implications. EPA's mandate to protect cultural resources is clear, as evidenced by the Federal laws discussed under Existing Regulations. EPA must consider possible impacts to sites listed on, or eligible for, the National Register in its issuance of new source NPDES permits.

In terms of environmental benefits, the General Conditioning approach has potential since every NPDES permit would include a condition requiring control of adverse impacts on cultural resources. EPA could work closely with the SHPO and OSA to ensure the identification and protection of these resources. The SHPO and OSA would be included on the mailing list for the Public Notice of the Proposed Issuance of each NPDES Permit. The applicant thus would not be required to consult with the SHPO and OSA or perform any recommended surveys prior to permit issuance. Section 106 review procedures specific to the SHPO/OSA's findings would automatically be included as a condition to the NPDES permit. Notification of proposed operations to the SHPO/OSA at issuance of the Draft NPDES permit would make this condition difficult to ignore. This option has the likelihood of realizing environmental benefits.

Under the Standard Conditioning alternative permit conditions would be applied only to those operations with identified cultural resources. However, it is very difficult to draft a standard permit condition appropriate to mitigate the wide variety of impacts on the cultural resources identifiable in the East Kentucky Coal Field. For this reason, the environmental benefits to be realized from the Standard Conditioning alternative are not as great as those possible under the General Conditioning or the Areawide-Individual approach. The General Conditioning alternative would provide for identification of cultural resources and collection of impact data as a permit condition, while the Areawide-Individual approach would provide for the same prior to permit issuance. Thus, the Areawide-Individual option has the greatest likelihood of realizing environmental benefits.

While all three of the alternatives could be argued to comply with the statutory requirements of NEPA, they differ in their potential for legal challenge through adjudicatory hearings.

Impacts on cultural resources may be significant, as described above, however, the resources are not widespread throughout the Coal Field. EPA clearly has the authority to require site specific documentation as a permit condition. Under the General Conditioning approach, the permit condition would be flexible enough to incorporate site specific findings of the SHPO/OSA. Provision is thus made for assessing the significance of impacts. Under the Standard Conditioning alternative, the cultural resources are identified prior to conditioning, however, the significance of the impact is not assessed due to the lack of impact data. Therefore, it is still possible that using this alternative, operations would be conditioned which would not have been if an individual analysis were conducted as provided under the Areawide-Individual or General Conditioning approach.

Processing time requirements are zero under the General Conditioning alternative. With the Standard Conditioning alternative it would take approximately five days to review the initial information and advise the Water Management Division whether or not to include the standard condition in the NPDES permit. Twenty days would be required to process an application under the Areawide-Individual alternative to make a Level II decision (i.e. review additional information submitted by the applicant) and an additional 30 days to review an EID, if required, and formulate a decision. These time frames do not consider applicant response times, which could include 60 days to prepare an EID. Over 300 days may be required to prepare an EIS.

The following analysis considers specific EPA manpower requirements and costs and mining applicant costs for this resouce area.

APPLICATIONS TRIPPING THRESHOLD LEVELS FOR ARCHAEOLOGICAL, HISTORIC AND PALEONTOLOGIC (annual estimate)*

Surface Mines	LI	170	LI	10	LII	1	LIII	0
Underground Mines	LI	120	LI	0	LII	0	LIII	0
Prep Plants	LI	40	LI	10	LII	2	LIII	0
TOTAL		330		20		3		0

EPA MANPOWER AND COST (annual manpower based on above estimations)*

Initial Review	175	hours
Review of additional questions	20	hours
Review of EIDs	72	hours
Preparation of EISs	0	hours

Total Work Hours 267

EIS Costs $ 0

APPLICANT COST (Annual cost based on above estimations)

Initial information	$	35,000	(100 x 350)
Additional questions		30,000	(20 x 1500)
EIDs		15,000	(3 x 5,000)
EISs		0	
TOTAL	$	80,000	

*Assumptions: (1) An EID will cost an average $5,000 and require 24 hours of EPA review time, (2) 80% of the EISs will be "third party" (i.e. no applicant EID preparation and a $100,000 applicant cost for preparation of the third party EIS), (3) 20% will require applicant preparation of the EID with EPA responsibility for the EIS, at a cost to EPA of $100,000, (4) EPA manpower requirements are 160 hours to process third party EISs and 184 hours for the EID/EIS combination.

The General Conditioning alternative would initially cost the applicant nothing in terms of data supplied to EPA, since none would be required. The general permit conditon described above would be included as a matter of course in each NPDES permit by the Region IV Water Management Division and, therefore, require no additional manpower. The Standard Conditioning alternative would require 175 EPA workhours of effort to review the responses to the initial environmental information and advise the Water Management Division to include the standard conditon. The cost to mining applicants would be approximately $35,000 per year to supply the Level I information. The EPA workhours required to handle the Areawide-Individual alternative would be an estimated 267 workhours and a potential EIS cost of $0. Applicants would probably spend $80,000 annually responding to requests for additional information, and preparing the estimated EIDs and EISs, including the initial information.

The Areawide-Individual alternative is the most flexible in terms of providing the appropriate mitigation measures and the likelihood that these measures would be implemented for the proposed mining operation. The General Conditioning approach offers basically the same flexibility, however, by not requiring data prior to permit issuance, would probably be more difficult to enforce. The Standard Conditioning approach would be evaluated a distant third.

Duplication of effort with other state and Federal laws and regulations has been taken into consideration prior to the development of any of the above described alternatives. However, the Areawide-Individual and General Conditioning approachs would be able to reflect mitigation measures considering the most current existing regulations. This additional coordination would not be immediately available under Standard Conditioning alternative.

RECOMMENDATION:

The Areawide-Individual alternative is recommended as the most appropriate approach to mitigate significant cultural resource impacts in the East Kentucky Coal Field. The extra cost involved to EPA and the applicant is minimal. This approach provides the greatest degree of environmental benefit. This benefit is felt to outweigh the additional costs involved. Where time constraints on permit issuance are identified as a problem, the General Conditioning alternative is recommended. The additional costs would be the same as for the Areawide-Individual alternative. Only the timing would be different. Assuming appropriate enforcement, the environmental benefit should be very close to that realized by the Areawide-Individual approach. Further, in comparison to the Standard Conditioning alternative, these approaches comply with regulation requirements, are more flexible, result in significant reduction in time to process permits (General Conditioning), and allow for coordination of effort with other regulations.

RECREATION LAND

DESCRIPTION OF IMPACT:

The recreation land resources of the Eastern Kentucky Coal Field include National, State, and local public parks; National Wildlife areas; National System of Trails; State wildlife management areas; and State or National Wild, Scenic or Recreational Rivers including rivers that are under study for such designation. Mining activities can adversely impact recreation land through the direct conversion to mining or other land uses as well as by the indirect effect of pollutants produced by the mining activities on nearby recreational areas. Noise and dust emissions from nearby mining activities including mines, preparation plants, and haul roads can interrupt recreational activities and reduce the recreational value of the land. Mining area runoff or drainage waters can flow to recreational waters affecting the aesthetic quality of the waters. Mining operations can visually detract from recreational experiences.

State and National forests are not included in the definition of recreational lands under this resource area since master plans for these areas do not designate or officially plan for recreational sites within the forests, according to the U.S. Forest Service.

TECHNICAL ALTERNATIVES:

There are several alternatives available to mitigate this impact:

- Reduction or redefinition of surface mined areas to boundaries where impacts on recreation land are eliminated or reduced.

- Selection of haul routes that will avoid recreation areas.

- Construction of barriers or use of natural topographic features as barriers to reduce or eliminate noise and visual impacts.

- Consideration of underground mining methods where surface mining is responsible for significant impacts.

- Stage mining and mining related activities to minimize adverse impacts.

- Relocation of surface facilities of underground mines where those facilities create major impacts.

EXISTING REGULATIONS:

Interim SMCRA regulations do not address protection of public parks. The permanent SMCRA program (30 CFR 761.11) does prohibit coal mining activities on any lands within National Parks, National Wildlife Refuges, the National System of Trails, Wilderness Areas, Wild and Scenic Rivers, and National Recreation areas. This regulation also prohibits surface mine operations within 300 feet of any public park or on any lands which will adversely affect any publicly owned park. These regulations do not protect recreation land from the adverse effects of mining, such as noise, dust, and visual intrusions, that occur more than 300 feet away.

Significant impacts, therefore, could occur to recreational lands from mining activities occurring more than 300 feet from the boundary of the recreational land.

ALTERNATIVES:

There are several alternatives available to EPA through the NEPA process to address this potential impact. These options are:

Areawide FONSI - The impact of mining operations on adjacent recreational land can be significant, degrading the quality of recreational activities or eliminating such activities. This impact could not be argued to be insignificant because of the many recreational areas located in the Coal Field.

Significant But Not Mitigatable - EPA could argue that although the impact is significant there are not technical or institutional means to mitigate the impact. However, mitigative measures are available that can be used to reduce or eliminate impacts on nearby recreational land.

General Conditioning - A general permit condition such as the following could be used to attempt to mitigate noise impacts by inclusion in every New Source NPDES permit:

> Mining activities shall be located or phased so that impacts to adjacent recreational land, such as high noise levels, dust emissions, and visual effects, will be minimized to nonintrusive levels.

Areawide-Individual - An individual review for each project employing the resource threshold criteria concept could analyze impacts utilizing the following criteria/levels. With this alternative, should a significant impact be identified, appropriate technical mitigation measures, such as those listed above could be selected.

LEVEL I Coal mining operations, including coal-related private and public haul roads, are located within 2,000 feet of a public park, National Park, National Wildlife Refuge, State Wildlife Management Area, National System of Trails, Wilderness area, State or National Wild, Scenic or Recreational River.

LEVEL II Coal mining operations proposed are likely to have a significant adverse impact on the resources described in the Level I criterion.

LEVEL III Coal mining operations proposed will have a significant unmitigated adverse impact on the resources described in the Level I criterion.

Standard Conditioning - A standard condition, such as the following, could be used to mitigate impacts for those mining operations meeting or exceeding the Level I criteria. The standard condition would state:

> The applicant shall construct barriers, use natural topographic features as barriers or redefine the mining boundary area to minimize mine and/or visual impacts on recreational land. Mining and related activities shall be staged to minimize the adverse effects on adjacent recreational land. Where appropriate, haul routes shall be relocated or reselected to avoid impacts on recreational land.

EVALUATION:

Coal mining impacts on recreation land have the potential to be significant in East Kentucky. This impact is mitigatable. The General Conditioning, Areawide-Individual and Standard Conditioning alternatives each have cost, environmental, timing and flexibility implications.

Under the Wild and Scenic Rivers Act, EPA is precluded from taking any action with a direct, adverse impact on rivers designated under Section 3 of the Act or those designated as having potential for inclusion under Section 5. Although EPA's mandate to protect other recreational lands is less well-defined, it can be assumed that most wildlife refuges, national parks, management areas and wilderness areas were established to protect species and their habitats regulated by the Endangered Species Act and the Fish and Wildlife Coordination Act.

In terms of environmental benefits, the General Conditioning approach has potential benefits since every NPDES permit would include a condition requiring control of adverse impacts. However, it would be very difficult to enforce the condition without having identified the impacts of specific projects. It is probable that applicants would ignore this condition, since no specific information would be available to USEPA. Therefore, it is doubtful that this potential for environmental benefits would be realized. This option has the least likelihood of realizing environmental benefit.

The Standard Conditioning alternative probably has more potential for realizing environmental benefits than the General Conditioning alternative. Permit conditions would be applied only to those operations exhibiting a likelihood of significant impacts to recreational land adjacent to the proposed mining site or along coal haul transportation routes. Although not as inclusive as the General Conditioning alternative, Standard Conditioning would be environmentally conservative in comparison to the Areawide-Individual approach (i.e. mitigation measures would be required of some operations which would probably not be required after an individual analysis). The Areawide-Individual requires mitigation only of those operations demonstrating, in accordance with detailed assessments, the potential for significant impacts.

While all three of the alternatives could be argued to comply with the statutory requirements of NEPA, they differ in their potential for challenge through adjudicatory hearings. Impacts have the potential to be significant as described above, however, they are not widespread. Size and type of mining operation determines actual impact, in addition to proximity to the recreational land. Additionally, recreational resources are not spread throughout the East Kentucky Coal Field. Under the General Conditioning approach, challenges to conditions might be expected for which EPA would have little site-specific documentation to support the condition. While this is also a potential problem under the Standard Conditioning alternative, the likelihood is not as great since some site-specific factors would have been considered prior to conditioning. The Areawide-Individual alternative with its individual analysis creates the least potential for losing such challenges and would result in the greatest level of mitigation.

USEPA processing time requirements are zero under the General Conditioning approach. The Standard Conditioning approach would take approximately five days for review of the initial environmental information and notification to the Water Management Division to include the standard condition. The Areawide-Individual approach would require 20 days to make a

Level II decision and an additional 30 days to review an EID. These time frames do not consider applicant response times, which could include 60 days to prepare an EID. Over 300 days may be required to prepare an EIS.

The following analysis considers specific EPA manpower requirements and costs and mining applicant costs for this resource area.

APPLICATIONS TRIPPING THRESHOLD LEVELS FOR RECREATIONAL LAND (annual estimate)

Surface Mines	LI	162	LI	18	LII	4	LIII	1
Underground Mines	LI	110	LI	10	LII	1	LIII	0
Prep Plants	LI	45	LI	5	LII	0	LIII	0
TOTAL		317		33		5		1

EPA MANPOWER AND COST (annual manpower based on above estimations)*

Initial Review	175	hours
Review of additional questions	33	hours
Review of EIDs	120	hours
Preparation of EISs	165	hours
Total Work Hours	493	
EIS Costs	$20,000	

APPLICANT COST (Annual cost based on above estimations)*

Initial information	$ 70,000	(200 x 350)
Additional questions	13,200	(400 x 33)
EIDs	20,000	(4 x 5,000)
EISs	81,000	(.8 x 100,000 + .2 x 5,000 = 81,000)
TOTAL	$184,200	

*Assumptions: (1) An EID will cost an average $5,000 and require 24 hours of EPA review time, (2) 80% of the EISs will be "third party" (i.e. no applicant EID preparation and a $100,000 applicant cost for preparation of the third party EIS), (3) 20% will require applicant preparation of the EID with EPA responsibility for the EIS, at a cost to EPA of $100,000, (4) EPA manpower requirements are 160 hours to process third party EISs and 184 hours for the EID/EIS combination.

WETLANDS

DESCRIPTION OF IMPACT:

Coal mining can significantly impact wetlands, a rare resource in the Eastern Kentucky Coal Field. Surface mining can result in the direct removal or elimination of wetlands during land clearing operations. Wetlands are also subject to indirect impacts from mining activities located nearby. The introduction of acid mine drainage and sedimentation into wetland areas, changes in groundwater and/or surface water flow, and alteration of soil moisture levels resulting from adjacent mining operations may result in the degradation of wetlands. Adverse impacts can result on vegetation and changes in species composition can occur. Mining operations also may use wetlands as areas in which to discharge effluent.

TECHNICAL ALTERNATIVES:

There are several alternatives available to mitigate this impact.

- Establish undisturbed buffer zones around wetlands to separate mining activities from the wetland area.
- Maintain natural groundwater flow rates into wetlands.
- Prohibit water of degraded quality from entering wetland areas.
- Reclaim disturbed land adjacent to wetlands as quickly as possible.
- Avoid mining in wetlands.

EXISTING REGULATIONS:

Existing regulations do not directly protect wetlands from the possible impact of mining operations in the Eastern Kentucky Coal Field. If a wetland is (1) designated as a Sensitive Ecosystem, (2) included in the habitat of a Federally listed threatened or endangered species, or (3) identified for protection under SMCRA's "lands unsuitable" program, a segment of the Act's permanent program, mining in the area could be prohibited. Additionally, the avoidance of wetland areas by mining operations might be required by the U.S. Corps of Engineers through its permit program authorized by Section 404 of the Clean Water Act.

ALTERNATIVES:

There are several alternatives available to EPA through the NEPA process to address this potential impact. These options are:

Areawide FONSI - The impacts of coal mining and related activities on wetlands could be argued to be insignificant since there are so few wetlands in the East Kentucky area.

Significant But Not Mitigatable - EPA could argue that although the impact is significant there are not technical or institutional means to mitigate the impact. However, mitigative measures are available to protect these resource areas from coal mining impacts.

General Conditioning - A general permit condition such as the following could be used to mitigate impacts by inclusion in every NPDES permit:

> The applicant shall ensure that mining operations will not adversely affect wetlands located on or adjacent to the permit area.

Areawide-Individual - An individual review for each project employing the resource threshold critera concept could analyze possible impacts to wetlands utilizing the following criteria/levels. With this approach, appropriate technical mitigative measures could be selected on a case by case basis when significant impacts are identified.

Level I	Wetlands located within or adjacent to the area proposed for surface disturbance by coal mining activities. Coal mining operations will discharge into, or hydraulically modify, a wetland area.
Level II	Proposed coal mining activities are likely to create a significant disturbance to wetland areas.
Level III	Proposed coal mining activities will create a signficant unmitigated adverse impact to significant wetland areas.

Standard Conditioning - A standard condition such as the following could be used to mitigate impacts for those mining operations meeting or exceeding the Level I criteria described above:

The applicant shall establish buffer zones to separate mining activities from identified wetland areas. Water quality in wetlands shall be protected by the applicant maintaining natural groundwater flow rates and preventing any discharge of degraded water into the wetland area.

EVALUATION:

Coal mining activities have the potential to create significant impacts on wetlands in Eastern Kentucky. This impact is mitigatable. The General Conditioning, Areawide-Individual and Standard Conditioning alternatives each have cost, environmental, timing and flexibility differences.

Executive Order 11990, "Protection of Wetlands", requires Federal agencies to avoid adverse impacts associated with the destruction or loss of wetland areas. EPA is also directed to avoid support of new construction in wetlands if a practicable alternative exists. The EPA Statement of Procedures on Floodplain Management and Wetlands Protection (1/5/79) stipulates that EPA must determine whether proposed actions will affect a wetland area. If so, a wetlands assessment must be prepared which analyzes avoiding or miniminzing EPA's adverse impacts. EPA's mandate to protect wetlands is clear.

In terms of environmental benefits, the General Conditioning approach has potential since every NPDES permit would include a condition requiring control of adverse impacts. However, it would be very difficult to enforce the condition wihout having identified and having data collected for wetlands. It is probable that applicants would ignore this condition, since no specific information would be available to EPA. Therefore, it is doubtful that this potential for environmental benefits will be realized. Permit conditions would be applied only to those operations directly or indirectly impacting wetlands. Although not as inclusive as the General Conditioning alternative, Standard Conditioning would be environmentally conservative in comparison to the Areawide-Individual approach (i.e. mitigation measures would be required of some operations which would probably not be required after an individual analysis).

The Areawide-Individual would require mitigation only of those operations demonstrating the potential for significant impacts on wetlands. The likelihood is greatest that the impact would be mitigated under this more detailed investigation procedure. Applicants would be required to investigate alternatives and address mitigation more carefully. This option has the greatest likelihood of realizing environmental benefits.

While all three of the alternatives could be argued to comply with the statutory requirements of NEPA, they differ in their potential for challenge through adjudicatory hearings. Coal mining impacts on wetlands are not likely to be widespread. Eastern Kentucky contains few wetland areas.

Under the General Conditioning approach, challenges to conditions might be expected for which EPA would have little site-specific documentation to support the condition. While this is also a potential problem under the Standard Conditioning alternative, the likelihood is not as great since some site-specific factors would have been considered prior to conditioning. The Areawide-Individual alternative with its individual analysis creates the least potential for losing such challenges and would likely result in the greatest level of mitigation. It appears to be the most implementable of the three alternatives.

Processing time requirements are zero under the General Conditioning alternative. The Standard Conditioning approach would take approximately five days for review of the initial environmental information and notification to the Water Management Division to include the standard condition. Twenty days would be required to process an application under the Areawide-Individual alternative to make a Level II decision and an additional 30 days to review an EID, if required, and formulate a decision. These time frames do not consider applicant response times, which could include 60 days to prepare an EID. Over 300 may be required to prepare an EIS.

The following analysis considers specific EPA manpower requirements and costs and mining applicant costs for this resource area.

APPLICATIONS TRIPPING THRESHOLD LEVELS FOR WETLANDS (annual estimate)

Surface Mines	LI	170	LI	10	LII	4	LIII	1
Underground Mines	LI	118	LI	2	LII	0	LIII	0
Prep Plants	LI	40	LI	10	LII	2	LIII	1
TOTAL		328		22		6		2

EPA MANPOWER AND COST (annual manpower based on above estimations)*

Initial Review	175	hours
Review of additional questions	22	hours
Review of EIDs	144	hours
Preparation of EISs	330	hours

Total Work Hours 671

EIS Costs $40,000

APPLICANT COST (Annual cost based on above estimations)*

Initial information	$ 35,000	(100 x 350)
Additional questions	22,000	(1,000 x 22)
EIDs	30,000	(6 x 5,000)
EISs	162,000	
	(1.6 x 100,000 + .4 x 5,000)	
TOTAL	$ 249,000	

*Assumptions: (1) An EID will cost an average $5,000 and require 24 hours of EPA review time, (2) 80% of the EISs will be "third party" (i.e. no applicant EID preparation and a $100,000 applicant cost for preparation of the third party EIS), (3) 20% will require applicant preparation of the EID with EPA responsibility for the EIS, at a cost to EPA of $100,000, (4) EPA manpower requirements are 160 hours to process third party EISs and 184 hours for the EID/EIS combination.

The General Conditioning alternative would cost the applicant nothing in terms of data supplied to EPA, since none would be required. The general permit condition described above would be included as a matter of course in each NPDES permit by the Region IV Water Management Division and, therefore, require no additional manpower. The Standard Conditioning alternative would require 175 EPA workhours of effort to review the initial environmental information and advise the Water Management Division to include one of the standard conditions. The cost to mining applicants would be approximately $35,000 per year to supply the Level I information. The EPA workhours required to handle the Areawide-Individual alternative would be greater, an estimated 671 workhours and a potential EIS cost of $40,000. Applicants would probably spend $249,000 annually responding to requests for additional information, and preparing the estimated EIDs and EISs, including the initial information.

The Areawide-Individual alternative is the most flexible in terms of providing the appropriate mitigation measures and the likelihood that these measures would be implemented for the proposed mining operation. The Standard Conditioning and General Conditioning approaches would be evaluated a distant second and third respectively.

Duplication of effort with other state and Federal laws and regulations has been taken into consideration prior to the development of any of the above described alternatives. The

Areawide-Individual analysis would be able to prepare mitigation measures considering the most current existing regulations. This additional coordination would not be immediately available under the General Conditioning and Standard Conditioning alternatives.

RECOMMENDATION:

The Areawide-Individual alternative is recommended as the most appropriate approach to mitigate significant wetlands impacts in the East Kentucky Coal Field. It is more costly to EPA and to the applicant than the other two alternatives, yet it provides a greater degree of environmental benefit. This benefit is felt to outweigh the additional costs involved and the additional processing time requirements due to the significance of the resources and potential impacts. Because of the relative scarcity of this resource in Eastern Kentucky, few mining applicants should become involved in impact assessments for wetlands. Further, in comparison to the General and Standard Conditioning alternatives, this approach would likely result in better protection against specific adverse impacts, is more flexible, would result in a greater ability to legally defend any conditions, and allows for coordination with other regulations.

NOISE

DESCRIPTION OF IMPACT:

In the Eastern Kentucky Coal Field, the rugged terrain necessitates the close geographic association of sensitive noise receptors (residences, schools, churches, and health care facilities) with certain coal mining activities. Coal haul roads, railroads, loadout facilities, and preparation plants are usually located in the relatively narrow river valleys along with other types of development including sensitive receptors. Each of these noise operations can produce significant noise impacts. While the mining sites are usually located in more remote areas, noise effects of rock drills and mine vent fans associated with deep mines can be significant. In addition, blasting may cause physical damage to structures through vibration.

This close association between noise sources and sensitive noise receptors in the Eastern Kentucky Coal Field has the potential to cause significant noise impacts to sensitive receptors. These impacts are measured in terms of dBA (decibels on the A weighted scale) and significance is determined to be an effect on a sensitive receptor equal to, or greater than, an L_{dn} of 73 dBA, which is approximately equal to an L_{eq} of 70 dBA. Noise calculations for coal haul trucks included in the attached Figure are presented in terms of L_{eq}, an easier measurement with which to make calculations. Noise levels above L_{eq} 70 dBA are considered to be very significant, potentially resulting in communication interference, hearing loss, heart disease, harmful effects on the unborn and children, mental and social problems, and even loss of life (EPA 1978b).

TECHNICAL ALTERNATIVES:

There are several alternatives available to mitigate this impact.

- Site Planning - With proper site planning most impacts can be eliminated by providing adequate buffer zones and topographical barriers.

- Equipment Maintenance - New and properly maintained equipment is generally quieter than older equipment. Noise sensitive components and noise control devices can be inspected and noise measurements made regularly with any necessary repairs and replacements made to maintain or lower original equipment noise levels. Typical devices used for equipment noise abatement are mufflers, derating engines, and sealed and lubricated tracks. Abatement measures can include engine vibration isolation, turbocharging, and lowered exhaust pipe exit height.

- Noise Barriers - The feasibility of erecting nose barriers in order to mitigate specific impacts can be assessed during the site planning stage. For example, mine vent fans are a stationary noise source throughout the mining operation. Noise shields around the fan could be an effective and feasible long term noise abatement measure. In addition, overburden storage could provide an effective earth berm barrier.

- Personnel Training - Equipment operators can be instructed on the quietest use of their equipment which may include lowered speed, slower acceleration, and lowered engine RPM.

- Operational Noise Restrictions - Time scheduling of operations during non-noise sensitive times can effectively reduce the overall noise impact to acceptable levels. For instance, nighttime operation could be curtailed in areas where sensitive receptors are located, thus reducing the L_{dn} or $L_{eq}(24)$ values.

- Coal Haul Trucks - Assure muffler systems are installed, operating properly, and maintained on haul trucks. Scheduling of hauling can also be an effective means of reducing the impact on sensitive receptors.

EXISTING REGULATIONS:

Few existing regulations control the noise impact identified above. SMCRA requires control of noise and vibration from blasting operations through use of pre-blast surveys, schedules, limits and explosive rules under both its interim and permanent programs. The permanent program also prohibits surface mining within 300 feet of occupied dwellings and other sensitive receptors, without consent waivers. While rock drills have been identified as a major source of noise by EPA, noise emission standards have not been published. Rock drills and mine vents have been determined to have the potential to elevate noise levels above L_{eq} 70 dBA at 300 and less feet from the noise source(s). Neither SMCRA nor any other Federal law addresses noise from coal hauling on public or private roads. The attached figure demonstrates the potentially significant impact resulting from large scale truck hauling. Coal loading facilities and preparation plants can also result in significant noise production.

ALTERNATIVES:

There are several alternatives available to EPA through the NEPA process to address this potential impact. These options are:

Areawide FONSI - EPA could attempt to argue that the noise impacts of coal mining, loading and preparation operations and coal haul truck traffic are not significant. However, it is possible to document noise levels exceeding 70 dBA at sensitive receptors emanating from on-site equipment and at sensitive receptors along transportation routes. This impact would be difficult to be argued to be insignificant since EPA's own reports document this decibel level as significantly affecting health.

Significant But Not Mitigatable - EPA could argue that although the impact is significant there are not technical or institutional means to mitigate the impact. In the case of noise, however, technical solutions are available that are relatively inexpensive to the applicant and could help mitigate the impact of increased noise levels. The institutional means to cause mitigation and any subsequent enforcement would be difficult.

General Conditioning - A general permit condition such as the following could be used to attempt to mitigate noise impacts by inclusion in every new source NPDES permit:

> The applicant shall ensure that noise levels at sensitive receptors to the mining operation and near coal transportation routes are less than an L_{eq} of 70 dBA.

Areawide-Individual - An individual review for each project employing the resource threshold criteria concept could analyze noise impacts utilizing the following criteria/levels. With this alternative, should a significant impact be identified, appropriate technical mitigation measures, such as those listed above could be selected on a case by case basis.

Level I	Coal production exceeds 1.5 million tons per year, and sensitive receptors are projected to experience an L_{eq} of 70 dBA from coal truck traffic on public or private haul roads (See attached nomograph for distance from the centerline of the road versus number of trucks per hour, and calculations showing the possibility of significant impact for operations with production of 1.5 million tons or more per year).

Level II	Coal haul truck traffic would produce an L_{eq} of 70 dBA at the closest sensitive receptor on coal haul roads identified under the Level I criterion after consideration of existing natural topographic or vegetative barriers or other site-specific conditions.
Level III	Proposed haul trucks would produce an Ldn of 73 dBA, or an L_{eq} of 70 dBA, at the closest sensitive receptor.

Standard Conditioning - A standard condition such as the following could be used to mitigate impacts for those mining operations meeting or exceeding the Level I criteria described above. For coal transportation routes with sensitive receptors located sufficiently close to the road to expect 70 dBA (based on trucks per day and as reflected in the attached nomograph), the condition would state:

> All coal haul trucks shall have muffler systems installed and maintained for proper operation. Where practicable, transportation routes will be altered to avoid sensitive receptors , and nighttime coal hauling will be avoided where sensitive receptors are located and an Ldn of 73 dBA is projected.

EVALUATION:

Noise has the potential to be a significant impact from coal operations in East Kentucky. This impact is mitigatable. The General Conditioning, Areawide-Individual, and Standard Conditioning alternatives each have cost, environmental, timing and flexibility implications.

In the Noise Control Act of 1972 (as amended by the Quiet Communities Act of 1978), Congress declared it to be the policy of the United States to promote an environment for all Americans free from noise that jeopardizes their health or welfare. To that end, it stated one of the Act's purposes as being the provision of information to the public respecting the noise emission characteristics of noise producing products. Although EPA's mandate in the area of noise is not specific or of a regulatory nature, it is clear that the agency has been directed to bring this issue to the public's attention.

In terms of environmental benefits, the General Conditioning approach has potential benefits since every NPDES permit would include a condition requiring control of adverse impacts (ie. noise levels of less than 70 dBA L_{eq}). However, it would be very difficult to enforce the condition without having identified and having noise data calculated for specific sensitive receptors. It is probable that applicants would ignore this condition, since no specific information would be available to EPA. Therefore, it is doubtful that this potential for environmental benefits would be realized. This option has the least likelihood of realizing environmental benefit.

The Standard Conditioning alternative has more potential for environmental benefits. Permit conditions would be applied only to those operations exhibiting a likelihood of significant noise impacts (i.e. 70 dBA or greater) along coal haul transportation routes. Although not as inclusive as the General Conditioning alternative, Standard Conditioning would be environmentally conservative in comparison to the Areawide-Individual approach (i.e. mitigation measures would be required of some operations which would probably not be required after an individual analysis).

The Areawide-Individual would require mitigation only of those operations demonstrating, in accordance with detailed noise studies, the potential for significant noise impacts. The likelihood is greatest that the impact would be mitigated under this more detailed investigation procedure. Applicants would be required to investigate alternatives and address mitigation more carefully. This option has the greatest likelihood of realizing environmental benefits.

While all three of the alternatives could be argued to comply with the statutory requirements of NEPA, they differ in their potential for legal challenge through adjudicatory hearings. Noise impacts have the potential to be significant as described above, however, they are not widespread. Size and type of mining operation determines actual noise levels, in addition to proximity of sensitive receptors.

Under the General Conditioning approach, challenges to conditions might be expected for which EPA would have little site-specific documentation to support the condition. While this is also a potential problem under the Standard Conditioning alternative, the likelihood is not as great since some site-specific factors would have been considered prior to conditioning. The Areawide-Individual alternative with its individual analysis creates the least potential for losing such challenges and would likely result in the greatest level of mitigation. It appears to be the most implementable of the three alternatives.

Processing time requirements are zero under the General Conditioning alternative. The Standard Conditioning approach would take approximately five days for review of the initial information and notification to the Water Management Division to include the standard condition. Twenty days would be required to process an application under the Areawide-Individual alternative to make a Level II decision and an additional 30 days to review an EID, if required, and formulate a decision. These time frames do not consider applicant response times, which could include 60 days to prepare an EID. Over 300 days may be required to prepare an EIS.

The following analysis considers specific EPA manpower requirements and costs and mining applicant costs for this resource area.

APPLICATIONS TRIPPING THRESHOLD LEVELS FOR NOISE (annual estimate)

Surface Mines	LI	179	LI	2	LII	0	LIII	0
Underground Mines	LI	118	LI	0	LII	0	LIII	0
Prep Plants	LI	49	LI	2	LII	1	LIII	0
TOTAL		346		4		1		0

EPA MANPOWER AND COST (annual manpower based on above estimations)*

Initial Review	100	hours
Review of additional questions	8	hours
Review of EIDs	24	hours
Preparation of EISs	0	hours
Total Work Hours	132	
EIS Costs	$ 0	

APPLICANT COST (Annual cost based on above estimations)*

Initial information	$ 70,000	(200 x 350)
Additional questions	6,000	(1,500 x 4)
EIDs	5,000	(5,000 x 1)
EISs	0	
TOTAL	$ 81,000	

*Assumptions: (1) An EID will cost an average $5,000 and require 24 hours of EPA review time, (2) 80% of the EISs will be "third party" (i.e. no applicant EID preparation and a $100,000 applicant cost for preparation of the third party EIS), (3) 20% will require applicant preparation of the EID with EPA responsibility for the EIS, at a cost to EPA of $100,000, (4) EPA manpower requirements are 160 hours to process third party EISs and 184 hours for the EID/EIS combination.

The General Conditioning alternative would cost the applicant nothing in terms of data supplied to EPA, since none would be required. The general permit condition described above would be included as a matter of course in each NPDES permit by the Region IV Water Management Division and, therefore, require no additional manpower. The Standard Conditioning alternative would require 100 EPA workhours of effort to review the initial environmental information and advise the Water Management Division to include one or both of the standard conditions. The cost to mining applicants would be approximately $70,000 per year to supply the Level I information. The EPA workhours required to handle the Areawide-Individual alternative would be greater, an estimated 132 workhours and a potential EIS cost of $0. Applicants would probably spend $81,000 annually responding to requests for the initial informtion, additional information, and preparing the estimated EIDs and EISs.

The Areawide-Individual alternative is the most flexible in terms of providing the appropriate mitigation measures and the likelihood that these measures would be implemented for the proposed mining operation. The Standard Conditioning and General Conditioning approaches would be evaluated a distant second and third respectively.

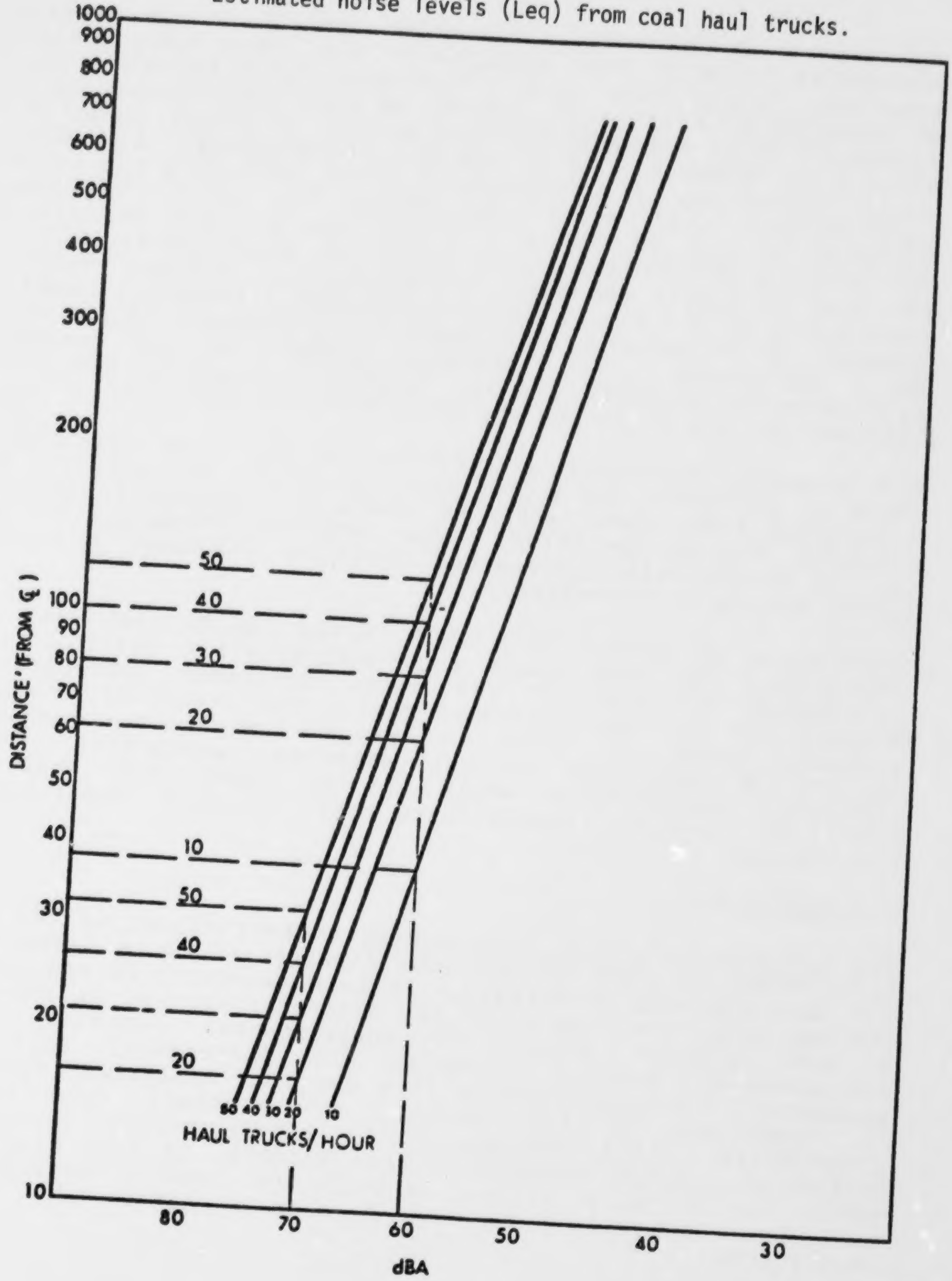
Duplication of effort with other state and Federal laws and regulations has been taken into consideration prior to the development of any of the above described alternatives. However, due to its individual review the Areawide-Individual analysis would be able to prepare mitigation measures considering the most current existing regulations. This additional coordination would not be immediately available under the General Conditioning and Standard Conditioning alternatives.

RECOMMENDATION:

The Areawide-Individual alternative is recommended as the most appropriate approach to mitigate significant noise impacts in the East Kentucky Coal Field. It is more costly to EPA and to the applicant than the other two alternatives, yet it provides a much greater degree of environmental benefit. This environmental benefit outweighs the incremental cost and processing time requirements in a marginal analysis. Further, in comparison to the General and Standard Conditioning alternatives, this approach would likely result in better protection against specific adverse impacts, is more flexible, would result in a greater ability to legally defend any conditions, and allows for coordination of effort with other regulations.

NOISE NOMAGRAPH

Estimated noise levels (Leq) from coal haul trucks.



RESOURCE THRESHOLD CRITERIA CALCULATIONS FOR NOISE

ASSUMPTIONS: Noise Nomagraph

70 dBA = Maximum acceptable noise level.

30 feet = Distance from centerline where expect to meet dBA of 70 from coal haul traffic.

50 = Number of passbys/hour to meet 70 dBA at 30 feet (25 loads/hour).

35T = Average capacity/haul truck.

8 = Hours/day of operation.

220 = Days/year of operation.

At 25 loaded passbys per hour, each carrying 35 tons, 875 tons per hour, or 7,000 tons per day, or 1.5 million tons per year would represent the annual production rate which (given all assumptions) might indicate a significant noise impact to sensitive receptors 30 feet from the centerline of haul roads.

Operations meeting this criteria would be requested to identify haul roads proposed for use, and sensitive receptors along these routes which (according to the Noise Nomagraph) could be subjected to noise levels in excess of 70 dBA.

If a potential problem is documented, operations would be required to investigate alternatives and/or address mitigation.

AIR QUALITY

DESCRIPTION OF IMPACT:

Coal mining activities can result in significant amounts of fugitive dust emissions. Other pollutants may also be emitted into the air as a result of these operations, but typically in insignificant amounts. Fugitive dust emissions are generated primarily due to truck traffic on haul roads. Other sources include surface mining, blasting, coal preparation, coal loading and unloading, and wind erosion. The transportation of coal by truck on unpaved/public and private haul roads is the major contributor of fugitive dust emissions from coal-related activities in eastern Kentucky.

The close proximity of many residential sites to haul roads exacerbates the problem of fugitive dust emissions. Residences and other sensitive receptors (e.g., health care facilities, schools, churches, and public parks) are generally located much closer to haul road routes than to actual mining or preparation areas. It is possible for significant impacts, in the form of primary ambient air quality standard violations, to occur along heavily travelled unpaved haul routes. A study performed by Evans and Cooper (1981) indicates that the major contribution to high TSP levels in the U.S. comes from fugitive dust sources. The attached figure demonstrates the potentially significant impact resulting from large scale truck hauling.

TECHNICAL ALTERNATIVES:

There are several alternatives available to mitigate this impact.

- Wet Suppression - Spraying unpaved haul roads with water or water plus a wetting agent can significantly reduce fugitive dust emissions.

- Chemical Stabilization - The application of chemical stabilizers to unpaved haul road surfaces can bind the dust particles together and prevent or reduce the amount of dust emissions created by traffic.

- Speed Reduction - Reducing the speed of haul trucks on unpaved coal haul routes can reduce dust emissions.

- Alternative Routes - Using alternative haul routes to minimize use of unpaved roads can result in an overall reduction of fugitive dust emissions.

- Paving - Paving haul routes, although expensive, can eliminate significant dust emissions.

EXISTING REGULATIONS:

The existing Federal and State regulations governing air emissions, including fugitive dust emissions, apply only to stationary sources or on-site sources of pollution. No regulations exist governing fugitive dust emissions resulting from coal truck traffic on off-site haul roads. Under certain circumstances these emissions can cause significant impacts. There are no requirements for dust suppression or other mitigation measures to be used on these off-site unpaved roads. Many of the haul routes used in eastern Kentucky are public roads, and some are both unpaved and have sensitive receptors located nearby.

ALTERNATIVES:

There are several alternatives available to EPA through the NEPA process to address this potential impact. These options are:

Areawide FONSI - EPA could argue that fugitive dust emissions from off-site unpaved roads used for coal transportation is not significant. It is possible, however, to document fugitive dust levels at sensitive receptors adjacent to unpaved roads equal to or in excess of National Ambient Air Quality Standards. This impact would be difficult to argue as insignificant.

Significant But Not Mitigatable - EPA could argue that although the impact is significant there are no technical or institutional means to mitigate the impact. However, mitigation measures are available to the applicant to reduce or eliminate fugitive dust emission impacts from unpaved haul roads as described under technical alternatives.

General Conditioning - A general permit condition such as the following could be used to attempt to mitigate fugitive dust impacts by inclusion in every New Source NPDES permit:

> The applicant shall utilize fugitive dust control measures on unpaved public and private haul roads to assure air quality at sensitive receptors does not exceed NAAQS particulate limits.

Areawide-Individual - An individual review for each project employing the resource threshold criteria concept could analyze fugitive dust emission impacts utilizing the following criteria levels. With this alternative, should a significant impact be identified, appropriate technical mitigation measures could be selected on a case by case basis.

LEVEL I	Coal production exceeds 350,000 tons/year and fugitive dust emissions created by coal haul truck traffic on unpaved public or private haul roads without controls may exceed National Ambient Air Quality Standards for total suspended particles at nearby sensitive receptors (e.g., residences, health care facilities, schools, churches, and public parks). (See attached nomagraph for distance from the centerline of the road versus number of trucks per day, and calculations showing the possibility of significant impact for operations with production of 350,000 tons or more per year.)
LEVEL II	Significant adverse impacts are likely to occur from proposed activities.
LEVEL III	Applicant proposed mitigative measures are not sufficient to reduce emissions from proposed project operations to below the level described in Level I.

Standard Conditioning - A standard condition such as the following could be used to mitigate impacts for those operations meeting or exceeding Level I criteria. The standard condition would state:

> Unpaved off-site haul roads adjacent to identified sensitive receptors shall be periodically watered, chemically stabilized, or paved, at the applicant's option, to minimize fugitive dust emissions and to ensure National Ambient Air Quality Standards are not exceeded at the receptor due to project operations.

EVALUATION:

Fugitive dust has the potential to be a significant impact from coal hauling operations in east Kentucky. This impact is mitigatable. The General Conditioning, Areawide-Individual, and Standard Conditioning alternatives each have cost, environmental, timing, and flexibility implications.

EPA's mandate to regulate fugitive dust emissions is not clearly defined. While there is a National Ambient Air Quality Standard for total suspended particulates, this standard has not been tied to fugitive emissions of coal haul trucks through a regulatory procedure.

In terms of environmental benefits, the General Conditioning approach has potential since every NPDES permit would include a condition requiring control of adverse impacts. However, it would be very difficult to enforce the condition without having identified and having emission data calculated for specific sensitive receptors. It is possible that applicants would ignore this condition if not specifically notified of a potential problem. Therefore, it is doubtful that this potential for environmental benefits will be realized. This option has the least likelihood of realizing environmental benefit.

The Standard Conditioning alternative probably has more potential for realizing environmental benefits than the General Conditioning alternative. Permit conditions would be applied only to those operations exhibiting a likelihood of significant fugitive dust impacts along unpaved coal haul routes. Although not as inclusive as the General Conditioning alternative, Standard Conditioning would be environmentally conservative in comparison to the Areawide-Individual approach (i.e., mitigation measures would be required of some operations which would probably not be required after an individual analysis).

The Areawide-Individual would require mitigation only of those operations demonstrating the potential for significant impacts to sensitive receptors. The likelihood is greatest that the impact would be mitigated under this more detailed investigative procedure. Applicants would be required to investigate alternatives and address mitigation more carefully.

While all three of the alternatives could be argued to comply with the statutory requirements of NEPA, they differ in their potential for legal challenge through adjudicatory hearings. Fugitive dust impacts have the potential to be significant as described above, however, they are not widespread. Size and type of mining operation determines actual emission levels, in addition to proximity of sensitive receptors. Under the General Conditioning approach, challenges to conditions might be expected for which USEPA would have little site-specific documentation to support the condition. While this is also a potential problem under the Standard Conditioning alternative, the likelihood is not as great since some site-specific factors would have been considered prior to conditioning. The Areawide-Individual alternative with its individual analysis creates the least potential for losing such challenges and would likely result in the greatest level of mitigation.

Processing time requirements are zero under the General Conditioning approach. The Standard Conditioning approach would take approximately five days for review of the initial questionnaire and notification to the Water Management Division to include the standard condition. The Areawide-Individual approach would require 20 days to make a Level II decision, up to 30 days to review an EID, and up to 45 days to review an EIS, if required. These time frames do not consider applicant response times which could include 60 days to prepare an evaluation of alternatives (EID). Over 300 days may be required to prepare an EIS.

The following analysis considers specific USEPA manpower requirements and costs as well as cost occuring to mining applicants for this resource area.

APPLICATIONS TRIPPING THRESHOLD LEVELS FOR AIR (annual estimate)

Surface Mines	LI	162	LI	18	LII	3	LIII	0
Underground Mines	LI	108	LI	12	LII	2	LIII	0
Prep Plants	LI	42	LI	8	LII	1	LIII	0
TOTAL		312		38		6		0

EPA MANPOWER AND COST (annual manpower based on above estimations)*

Initial information	100	hours
Review of additional questions	76	hours
Review of EIDs	144	hours
Preparation of EISs	0	hours
Total Work Hours	320	
EIS Costs	0	

APPLICANT COST (Annual cost based on above estimations)*

Initial information	$ 70,000	(200 x 350)
Additional questions	190,000	(5000 x 38)
EIDs	30,000	(6 x 5,000)
EISs	0	
TOTAL	$290,000	

*Assumptions: (1) An EID will cost an average $5,000 and require 24 hours of EPA review time, (2) 80% of the EISs will be "third party" (i.e., no applicant EID preparation and a $100,000 applicant cost for preparation of the third party EIS), (3) 20% will require applicant preparation of the EID with EPA responsibility for the EIS, at a cost to EPA of $100,000 and, (4) EPA manpower requirements are 160 hours to process third party EISs and 184 hours for the EID/EIS combination.

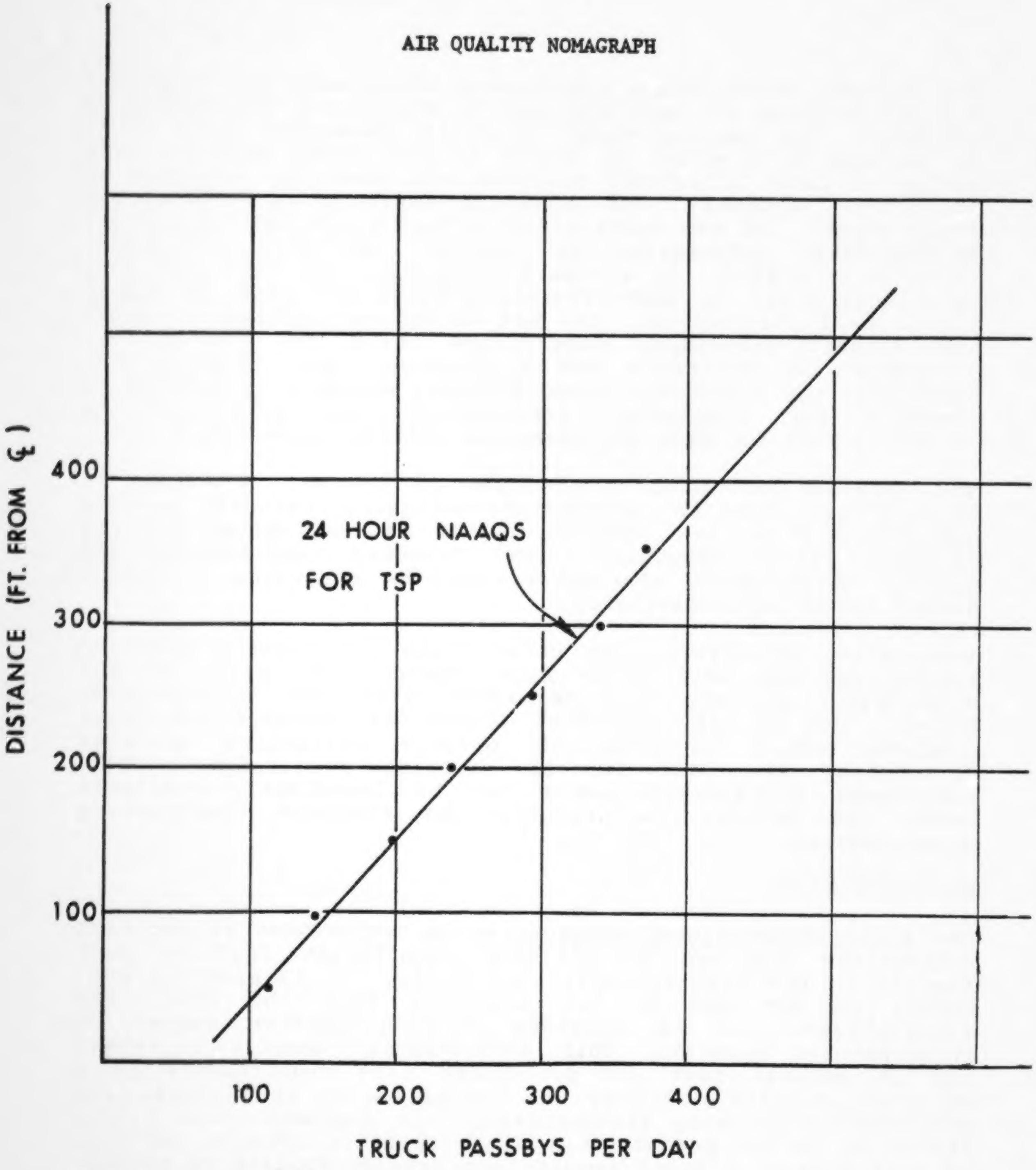
The General Conditioning alternative would cost the applicant nothing in terms of data supplied to EPA, since none would be required. The general permit condition described above would be included as a matter of course in each NPDES permit by the Region IV Water Management Division and, therefore, require no additional manpower. The Standard Conditioning alternative would require 100 EPA workhours of effort to review the initial environmental information and advise the Water Management Division to include the standard condition. The cost to mining applicants would be approximately $70,000 per year to supply the Level I information. The EPA workhours required to handle the Areawide-Individual alternative would be greater, an estimated 320 workhours and a potential EIS cost of $0. Applicants would probably spend $290,000 annually responding to requests for additional information, and preparing the estimated EIDs and EISs including the initial information.

The Areawide-Individual alternative is the most flexible in terms of providing the appropriate mitigation measures and the likelihood that these measures would be implemented for the proposed mining operation. The Standard Conditioning and General Conditioning approaches would be evaluated a distant second and third respectively.

Duplication of effort with other State and Federal laws and regulations has been taken into consideration prior to the development of any of the above described alternatives. However, due to its individual review the Areawide-Individual analysis would be able to prepare mitigation measures considering the most current existing regulations. This additional coordination would not be immediately available under the General Conditioning and Standard Conditioning alternatives.

RECOMMENDATION:

The Areawide-Individual alternative is recommended as the most appropriate approach to mitigate significant fugitive dust impacts in the East Kentucky Coal Field. It is somewhat more costly to EPA and to the applicant than the other two alternatives, yet it provides a much greater degree of environmental benefit. This environmental benefit outweighs the incremental cost and processing time requirements in a marginal analysis. Further, in comparison to the General and Standard Conditioning alternatives, this approach would likely result in better protection against specific adverse impacts, is more flexible, would result in a greater ability to legally defend any conditions, and allows for coordination of effort with other regulations.



Task Report on Air Quality, Wapora, Inc.,
1981. Prepared in connection with the East
Kentucky Areawide EIS

RESOURCE THRESHOLD CRITERIA CALCULATIONS
FUGITIVE DUST EMISSIONS

ASSUMPTIONS:

Air Quality Nomagraph

Haul Roads Unpaved

Average Operation:
8 hours per day
220 days per year

Average Haul Truck = 35 Ton Capacity

Each Truck Passby = 1/2 Round Trip

According to the Air Quality Nomagraph, at approximately 30 feet from the centerline of an unpaved road, NAAQS would be exceeded at approximately 90 truck passbys per day, or 45 loaded passbys per day. At 35 tons per truck for 220 days of operation, this would represent annual production of 346,500, or rounded, 350,000 tons per year. Given all assumptions, a sensitive receptor within 30 feet of the centerline of the unpaved road would thus likely be impacted.

Operations meeting this criteria would be requested to identify unpaved haul roads proposed for use, and sensitive receptors along these routes which (according to the Air Quality Nomagraph) could be subjected to fugitive dust emissions in excess of NAAQS.

If a potential problem is documented, operations would be required to investigate alternatives and/or address mitigation.

ENVIRONMENTALLY SIGNIFICANT AGRICULTURAL LANDS

DESCRIPTION OF IMPACT:

The cumulative effect of continued coal production and increasing population levels in the Eastern Kentucky Coal Field will result in the conversion of agricultural land to urban and mining-related uses. This conversion is considered to be a significant impact because of the relative scarcity and high economic value of this land resource in the East Kentucky Coal Field. Prime agricultural land accounts for approximately 6% of the Coal Field.

Coal mining activities, particularly surface mining and preparation plant operations, on agricultural lands can permanently destroy the productive potential of the natural soil. The further reduction of this farmland in Eastern Kentucky would diminish the region's cropland base and diminish environmental quality by reducing the beneficial role which the land can play. Agricultural land reduces runoff by absorbing precipitation, aids in replenishing groundwater supplies, buffers environmentally sensitive areas from encroaching development, and can serve in wastewater treatment through land treatment processes.

Preparation plants are located necesarily in the flat valleys of East Kentucky in proximity to transportation networks. These flat floodplains are also the location of most prime agricultural lands in the region. In addition to the plant facilities themselves, disposal of sludge from plants creates the potential for significant adverse impacts on agricultural lands. Where sludge is deposited , covering prime agricultural soils, the soils cannot be reclaimed.

TECHNICAL ALTERNATIVES:

There are several alternatives available to mitigate this impact.

- Underground mining could be utilized where surface mining would disturb large areas of farmland.

- Surface mining and reclamation operations could meet the following techniques for soil removal, stockpiling, and replacement:

    1. Topsoil materials to be used in the reconstruction of the farmland topsoil could be removed before drilling, blasting, or mining in a manner that prevents mixing or contaminating these materials with undesirable material.

2. Soil Removal

Surface coal mining and reclamation operations on prime farmland could be conducted to:

(a) separately remove the entire A horizon or other suitable soil materials and create a final soil having an equal or greater productive capacity than that which existed prior to mining;

(b) separately remove the B horizon of the soil, a combination of B horizon and underlying C horizon, or other suitable soil material and reconstruct the soil to equal or greater productive capacity than that which existed before mining;

(c) separately remove the underlying C horizons, other strata, or a combination of horizons or other strata, to be used instead of the B horizon. When replaced, these combinations could be equal, or more favorable for plant growth, than the B horizon.

3. Soil Stockpiling

If not utilized immediately, the A horizon or other suitable soil materials and the B horizon or other suitable soil materials can be stored separately from each other and from spoil material. These stockpiles can be placed within the permit area where they are not disturbed or exposed to excessive water or wind erosion before the stockpiled horizons are to be redistributed.

4. Soil Replacement

Surface coal mining and reclamation operations on farmland could be conducted according to the following:

(a) The minimum depth of soil and soil material to be reconstructed for farmland can be 48 inches, or to a depth equal to the depth of a subsurface horizon in the natural soil that inhibits root penetration, whichever is shallower. A depth greater than 48 inches can be restructured whereever appropriate to restore productive capacity where uniquely favorable soil horizons exist at greater depths.

(b) Soil material can be replaced on land which has been returned to final grade and scarified to enhance the capability of reconstructed soil to achieve equivalent or higher levels of yield.

(c) Soil horizons or other suitable soil material can be replaced in a manner that avoids excessive compaction.

There are no alternatives available to mitigate the adverse impacts of locating preparation plants or their sludge disposal areas on ESA lands other than relocation. Relocation is not feasible due to the need for prep plants to be located near transportation networks. Sludge disposal areas could be required to be located away from the prep plant sites, on lands not categorized as ESA lands.

EXISTING REGULATIONS:

EPA's policy is to consider the protection of the nation's Environmentally Significant Agricultural (ESA) lands from irreversible conversion to uses which result in its loss as an environmental or essential food production resource. Before undertaking an action, EPA must determine whether there are Environmentally Significant Agricultural lands in the proposed permit area. If such lands are identified, direct and indirect effects of the undertaking on the land must be evaluated and adverse effects avoided or mitigated, to the extent possible, in accordance with EPA's Policy to Protect Environmentally Significant Agricultural Lands (EPA, September 8, 1978).

EPA defined ESA lands for the Eastern Kentucky Coal Field have been determined to include prime farmland, unique farmland, farmland of statewide importance, and farmland of local importance. These categories are all identified by the Soil Conservation Service, USDA. Other categories included in the EPA definition of ESA lands (i.e. farmlands of waste utilization importance, farmlands serving as buffers to environmentally sensitive areas, and farmlands used for significant BMP projects) are covered elsewhere under the resource threshold criteria or were not considered appropriate for the East Kentucky environment. Contact with the SCS has indicated no unique farmlands or farmlands of statewide or local importance are located in Eastern Kentucky.

SMCRA interim and permanent programs require detailed impact control measures (identical to those described under Technical Alternatives above) for prime agricultural lands cultivated for at least 5 of the 10 years prior to acquisition for mining purposes. (Note: This SMCRA definition of prime farmland is currently being finalized. It is anticipated that the regulations will cover the land described above. If it is not defined and regulated as stated above, the following statement on significant impacts may have to be altered, as well as the discussion of alternatives.)

Significant impacts could be expected from surface coal mining and preparation plant sludge disposal activities on prime farmlands cultivated for less than 5 of the previous 10 years since these are not covered by other statutes.

ALTERNATIVES:

There are several alternatives available to EPA through the NEPA process to address this potential impact. These options are:

Areawide FONSI - EPA could attempt to argue that the impacts of coal mining and preparation plants on prime farmlands are not significant. Only 6% of the Coal Field is categorized as prime farmland. Further, SMCRA fully addresses prime farmland that has been in production 5 of the last 10 years. EPA would have to argue that the loss of the prime farmland not covered by SMCRA would not be significant. Coal mining can impact agricultural land by permanently destroying the productive potential of the natural soil. This impact could not be argued to be insignificant due to EPA's policy statement and the importance of this rare resource in Eastern Kentucky.

Significant But Not Mitigatable - EPA could argue that although the impact is significant there are not technical or institutional means to mitigate the impact. However, technical solutions are available, as described above, that could mitigate the impact on the natural soils. No mitigation is available for preparation plant siting other than relocation. Relocation is not a realistic alternative. Since these plants must be located adjacent to rail and/or roadways they tend to be near rivers and streams, which are also the predominant areas of prime farmlands in Eastern Kentucky.

General Conditioning - A general permit condition such as the following could be used to attempt to mitigate impacts on the natural soils by inclusion in every new source NPDES permit for surface mining:

> The applicant shall ensure that prime farmlands proposed for surface mining are reclaimed through soil removal, stockpiling and replacement according to SMCRA procedures.

Areawide-Individual - An individual review for each project employing the resource threshold criteria concept could analyze impacts on prime farmlands utilizing the following criteria/levels. With this alternative, should a significant impact be identified, appropriate technical mitigation measures could be selected on a case by case basis.

Level I	Prime farmlands cultivated less than 5 of the previous 10 years are proposed for surface disturbance by coal mining and preparation plant sludge disposal activities, exclusive of coal haul roads or preparation plant site facilities.
Level II	Proposed coal mining activities are likely to create a significant adverse impact on prime farmlands.
Level III	Proposed coal mining activities will irretrievably convert a significant acreage of ESA lands.

Standard Conditioning - A standard condition such as the following could be used to mitigate impacts for those surface mining operations meeting or exceeding the Level I criteria described above.

> Surface mining and reclamation operations shall meet the requirements for soil removal, stockpiling, and replacement described on the attached sheet for prime farmlands (whether or not cultivated in the previous ten years). (NOTE: The sheet attached to the permit would outline the four steps detailed under Technical Alternatives above).

EVALUATION:

Coal mining and sludge disposal from preparation plants have the potential to impact prime farmlands in East Kentucky. This impact is mitigatable. The General Conditioning, Areawide-Individual and Standard Conditioning alternatives each have cost, environmental, timing and flexibility implications. Coal preparation facilities can also be expected to impact some ESA lands, however, the number of acres impacted should be very small.

EPA's mandate to protect Environmentally Significant Agricultural lands is clear, as evidenced by its Policy to Protect ESA Lands dated September 8, 1878 which recognized the food production and environmental values of agricultural lands.

The General Conditioning approach has potential for environmental benefits since every surface mining NPDES permit would include a condition requiring soil reclamation measures. However, it will be very difficult to enforce the condition without having specifically identified these soil types (with the assistance of the Soil Conservation Service, USDA). Prime farmlands cultivated at least 5 of the past 10 years will have been identified under the SMCRA application. It is the additional prime farmland which will not be identified through any formal procedures. Therefore, it is doubtful that this potential for environmental benefits be realized. This option has the least likelihood of realizing environmental benefit.

Under the Standard Conditioning alternative, it is more probable that these benefits will be realized. Once additional prime farmland is identified, the standard permit condition suggested above could be applied to those surface mining disturbances on these lands.

The Areawide-Individual alternative would reduce the number of mining operations subject to the permit condition since the individual analysis would consider significance of effect on the identified prime farmlands prior to imposing the condition (e.g. conditions might not be imposed on an operation disturbing a relatively small area of prime farmland with relatively little or no potential for future use for agricultural operations). It is doubtful, however, that the numbers would be greatly reduced over the Standard Conditioning alternative. In addition, the mitigation measures required under the Standard alternative would be identical to those required under the Areawide-Individual, i.e. the soil reclamation controls described under Technical Alternatives above. Therefore, environmental benefits are basically the same under the Standard Conditioning and Areawide-Individual approaches.

While all three of the alternatives could be argued to comply with the statutory requirements of NEPA, they differ in their potential for challenge through adjudicatory hearings. Mining impacts on prime farmlands in Eastern Kentucky are not widespread. The total land area in East Kentucky categorized as prime farmland, and not subject to the SMCRA reclamation requirements, is likely very small. Under the General Conditioning approach, challenges to conditions might be expected for which EPA would have little site-specific documentaton to support the condition. While this is also a potential problem under the Standard Conditioning alternative, the likelihood is not as great since additional prime farmland would have been identified. The Areawide-Individual alternative with its individual analysis has a similar likelihood for challenge as the Standard Conditioning.

Processing time requirements are zero under the General Conditioning alternative. The Standard Conditioning approach would take approximately 5 days for review of the initial environmental information and notification to the Water Management Division to include the standard condition. Twenty days would be required to process an application under the Areawide-Individual alternative to make a Level II decision and an additional 30 days to review an EID, if required, and formulate a decision. These time frames do not consider applicant response times, which could include 60 days to prepare an EID and over 300 for an EIS.

The following analysis considers specific EPA manpower requirements and costs and mining applicant costs for this resource area.

APPLICATIONS TRIPPING THRESHOLD LEVELS FOR ESA LANDS (annual estimate)

Surface Mines	LI	170	LI	10	LII	0	LIII	0
Underground Mines	LI	115	LI	5	LII	0	LIII	0
Prep Plants (sludge disposal only)	LI	45	LI	5	LII	1	LIII	0
TOTAL		330		20		1		0

EPA MANPOWER AND COST (annual manpower based on above estimations)*

Initial Review	175	hours
Review of additional questions	20	hours
Review of EIDs	24	hours
Preparation of EISs	0	hours
Total Work Hours	219	
EIS Costs	$ 0	

APPLICANT COST (Annual cost based on above estimations)*

Initial review	$ 140,000	(400 x 350)
Additional questions	2,000	(100 x 20)
EIDs	5,000	(1 x 5,000)
EISs	0	
TOTAL	$ 147,000	

*Assumptions: (1) An EID will cost an average $5,000 and require 24 hours of EPA review time, (2) 80% of the EISs will be "third party" (i.e. no applicant EID preparation and a $100,000 applicant cost for preparation of the third party EIS), (3) 20% will require applicant preparation of the EID with EPA responsibility for the EIS, at a cost to EPA of $100,000, (4) EPA manpower requirements are 160 hours to process third party EISs and 184 hours for the EID/EIS combination.

The General Conditioning alternative would cost the applicant nothing in terms of data supplied to EPA, since none would be required. The general permit condition described above would be included as a matter of course in each NPDES permit by the Region IV Water Management Division and, therefore, require no additional manpower. The Standard Conditioning alternative would require 175 workhours of effort to review the initial environmental information, make a decision as to whether or not the application triggers Level I, and advise the Water Management Division to include the standard condition. The cost to mining applicants would be approximately $147,000 per year to supply the initial environmental information. The EPA workhours required to handle the Areawide-Individual would be an estimated 219 workhours and a potential EIS cost of $0. Applicants would probably spend $147,000 annually responding to requests for initial information, additional information, and preparing the estimated EIDs and EISs.

The Areawide-Individual alternative is the most flexible in terms of providing the appropriate mitigation measures and the likelihood that these measures would be implemented for the proposed mining operation. The Standard Conditioning and General Conditioning approaches would be evaluated a distant second and third respectively.

Duplication of effort with other state and Federal laws and regulations has been taken into consideration prior to the development of any of the above alternatives. However, due to its individual review the Areawide-Individual analysis would be able to prepare mitigation measures considering the most current existing regulations. This coordination would not be immediately available under the General Conditioning and Standard Conditioning alternatives.

RECOMMENATION:

The Areawide-Individual alternative appears to be the most appropriate approach to mitigate significant impacts from coal mining and sludge disposal on prime farmlands in the East Kentucky Coal Field. This alternative is slightly more costly to EPA and to the applicant, however, it is assumed that the applicant would rather spend money investigating the significance of the impact and possible various technical alternatives than automatically be required to pay the high cost associated with reclamation. Additionally, the number of acres subject to additional investigation is not substantial. EPA's mandate to protect Environmentally Significant Agricultural Lands outlined in Administrator Costle's policy memo is further reason to recommend the Areawide-Individual approach for ESA lands.

PUBLIC COMMENT

DESCRIPTION OF IMPACT:

Public comment plays a key role in providing flexibility to the environmental review process. The Resource Threshold levels for the previous resource areas attempt to clarify the difference between insignificant and significant adverse impacts on environmental resources. However, because of the great variety of environmental resources potentially impacted, as well as changes in the coal mining industry, the identified resources and levels may not always identify every potential impact. Public, local, state and federal agency comment is valuable input into the environmental review process. It is a method of further identifying any significant adverse impacts.

EXISTING PUBLIC NOTICE PROVISIONS:

The interim SMCRA program requires a Notice of Intent be published in a local newspaper prior to the submission of a mining application to the state. This public notice occurs prior to the NEPA compliance process/environmental review undertaken by EPA in connection with applications for NPDES permits. Some public concerns could be known and considered during the initial environmental review process if an agreement is reached with the state to supply EPA copies of any public comments.

When the draft NPDES permit is proposed, there is another public comment period specifically for the purpose of addressing concerns related to proposed effluent discharges and the environmental review conducted for the new source. It is at this time that all public concerns should be known with which EPA can make final decisions regarding its environmental review.

ALTERNATIVES:

There are basically two alternatives with regard to this Public Comment Criteria, either (1) use the public comment in a format similar to that proposed for each of the resource areas described earlier or (2) do not use the Criteria at all.

The Criteria would not become involved with those resource areas determined to impact the Eastern Kentucky Coal Field insignificantly or determined to be unmitigatable. The Criteria is not appropriate for the General or Standard Conditioning approaches since data gathering and determination of significance of impact must be undertaken prior to the development of a condition. The environmental issues raised by the public could vary substantially. If the Public Comment Criteria is to be used, the appropriate format would be similar to the Areawide-Individual alternative suggested for other resource areas.

Areawide-Individual alternative - Substantive issues dealing with any of the resource threshold areas could be considered, and review decisions made, on the basis of the following levels. With this alternative, should a significant impact be identified, appropriate technical mitigation measures could be selected on a case by case basis.

Level I	Significant issues raised by public, local, state or federal parties on a resource area not otherwise identified or adequately addressed.
Level II	Significant adverse impacts are likely to result to resource area identified under Level I.
Level III	Unmitigated significant adverse impacts will result to resource area identified under Level I.

EVALUATION:

The following analysis considers specific EPA manpower benefits and costs and mining applicant costs for the Public Comment Criteria.

APPLICATIONS TRIPPING THRESHOLD LEVELS FOR PUBLIC COMMENT (annual estimate)

	LI	LI	LII	LIII
Surface Mines	172	18	0	0
Underground Mines	108	12	0	0
Prep Plants	45	5	0	0
TOTAL	315	35	0	0

EPA MANPOWER AND COST (annual manpower based on above estimations)*

Initial Review	N/A	hours
Review of additional questions	35	hours
Review of EIDs	0	hours
Preparation of EISs	0	hours
Total Work Hours	35	
EIS Costs	$ 0	

APPLICANT COST (Annual cost based on above estimations)*

Initial information	$	N/A	
Additional questions		28,000	(35 x 800)
EIDs		0	
EISs		0	
TOTAL	$	28,000	

*Assumptions: (1) An EID will cost an average $5,000 and require 24 hours of EPA review time, (2) 80% of the EISs will be "third party" (i.e. no applicant EID preparation and a $100,000 applicant cost for preparation of the third party EIS), (3) 20% will require applicant preparation of the EID with EPA responsibility for the EIS, at a cost to EPA of $100,000, (4) EPA manpower requirements are 160 hours to process third party EISs and 184 hours for the EID/EIS combination.

RECOMMENDATION:

It is recommended that the Public Comment Criteria be included in the package of Resource Threshold Criteria in the form of the Areawide-Individual approach suggested above. As discussed earlier, the resources and levels identified for each of the previous resource areas may not always identify every potential impact due to the great variety of environmental resources requiring protection and the changes in the coal mining industry. The cost to EPA and to the applicant for providing this additional environmental protection is considered minimal when weighed against the potential benefits.

TRANSPORTATION

DESCRIPTION OF IMPACT:

Local transportation networks, primarily the road system, can be adversely affected by mining activities and mining-induced population growth. Public safety problems on local roads can occur as a result of (1) the larger number of commercial vehicles (primarily coal haul trucks) using public roadways, (2) the larger volumes of private vehicles using the roadways, and (3) increases in coal-related rail traffic which cause a higher probability of rail-highway crossing accidents at intersections. The larger volumes of coal haul trucks using public roadways and trucks exceeding specified weight limits may also degrade the quality of the road surface and weaken bridges.

TECHNICAL ALTERNATIVES:

- Develop alternative haul routes to be used to relieve primary haul routes during peak traffic volume periods if public safety hazards develop.
- Consideration of alternative hauling methods (e.g. rail, conveyor, barge, or pipeline) if other mitigative methods are not able to lessen impacts.
- Relocation of facilities such as preparation plants or tipples to reduce local transportation impacts.
- Rebuild and/or repair existing bridges and/or roadways.
- Provide elevated rail or roadway crossings.

EXISTING REGULATIONS:

Under the provisions of NEPA, the evaluation of impacts on the human environment is to be considered broadly. Environmental impact assessments must include consideration of effects on the social and economic environment as well as the natural and physical environment. These effects are those directly and indirectly caused by the action (e.g. growth inducing effects, changes in land use and transportation patterns and population densities). Therefore, local transportation impacts are incorporated into the NPDES review process for new source coal mines through the provisions of NEPA. There are, however, no regulatory controls which address mitigation of the transportation impacts described above.

Under the interim SMCRA program all applicants must submit a transportation plan approved by the state Department of Transportation with their mining applications. Basically, the state DOT classifies proposed routes in terms of weight limits and provides information on any substandard bridges intended for use. This data is passed on with the transportation plan. DOT does not disapprove, or condition, any plans.

Regulating weight limits on coal haul trucks to lessen road degradation has been difficult to enforce in Eastern Kentucky. A coal severance tax (KRS 177.960) is imposed on all coal mined within Kentucky. This tax, a percentage of the sales price of the produced coal, is paid monthly by coal companies to the state Department of Revenue. According to the recently passed Local Government Economic Assistance Act (KRS 42.455), any coal severance funds collected in excess of $177.6 million are to be divided equally between the state and the local governments (i.e. counties and municipalities). Designated coal producing counties receive 90% of the local share and designated coal impact counties (i.e. those counties with no active mines but through which coal is transported) receive 10%. Approximately $200 million in coal severance tax is anticipated for fiscal year 1981-82. The Local Assistance Act establishes ten priority areas for these funds, including public safety, environmental protection and public transportation. A minimum of 30% of these funds must be used for road improvement, including replacement of substandard bridges.

An access permit must be acquired for proposed mining facilities intersecting state routes. DOT (District Office) performs on-site reviews of proposed plans, analyzing drainage, grade, location of access (depending on the type of road the access must be a certain distance from any other access point), public safety aspects and the number of vehicles serving the facility. The proposed plans must be approved prior to issuance of the access permit. A bond must be placed with DOT to cover proposed access construction.

Public safety hazards at mining facility access points/intersections appear to be sufficiently controlled by the state DOT through its access permit program. Maintenance of coal haul roads appears to be handled as efficiently as possible through the state coal severence tax program which regulates all mining operations. Therefore, transportation impacts in the form of public safety problems associated with coal mining activities can be argued to be adequately addressed through the existing state regulations.

RECOMMENDATION:

An Areawide FONSI should be the recommended alternative for the transportation resource area. Transportation impacts associated with coal mining activities are adequately addressed through existing state regulations.

SOCIOECONOMIC IMPACTS

DESCRIPTION OF IMPACT:

The economic impacts of coal development in Eastern Kentucky can be considered beneficial to the economic base of the coal field as well as in the economic status of the residents. As coal mining becomes more extensive and provides more employment opportunities, the economic base of the Eastern Kentucky Coal Field will become further oriented towards coal mining.

A heavy reliance on coal mining, however, has inherent risks, endangering the economic and social well-being of residents of Eastern Kentucky. This heavy reliance may lead to unforeseen fluctuations in employment, particularly in a situation of fluctuating demand for coal. The heavy out-migration of Eastern Kentucky residents during the 1960's would have been far less severe had the economy exhibited greater diversification.

The most significant adverse effects of coal resource development on human resources are caused by rapid population growth or declines. Rapid population growth occurs in response to the sudden creation of jobs in an area that does not have a local labor force of sufficient size and/or skill to fill the available positions. The new residents require adequate levels of basic community services and facilities (infrastructure) such as housing, wastewater treatment, water, health care, education, transportation network, fire and police protection, and recreational facilities. Population declines can occur due to loss of jobs should the demand for coal decline.

In most instances, the existing tax base of the community cannot supply these services and facilities to the new residents on short notice. Because of the lag in the receipt of tax revenues from the new residents and the long lead times and high costs of required public improvement projects, strains on existing infrastructure elements occur. Most East Kentucky mining operations are relatively small. Individual operations rarely create "overnight" impacts on local communities. However, the cumulative effect of increased coal mining can lead to significant adverse impacts.

TECHNICAL ALTERNATIVES:

- Taxing of the mining industry to provide assistance funds to local governments to construct facilities and provide services to accommodate rapid population growth in local communities.

- State or Federal appropriation of general funds to specifically aid communities in the coal producing areas.

EXISTING REGULATIONS:

Under the provisions of NEPA, the evaluation of impacts on the human environment is to be considered broadly. Environmental impact assessments must include consideration of effects on the social and economic environment as well as the natural and physical environment. These effects are those directly and indirecty caused by the action (e.g. growth inducing effects, changes in land use patterns and population densities). Therefore, local social and economic impacts are incorporated into the NPDES review process for new source coal mines through the provisions of NEPA. There are, however, no regulatory controls which address mitigation of the economic and social impacts described above.

Planning assistance for local communities impacted by coal mining was provided under the Section 601 program administered by the Economic Development Administration. However, the current administration has not extended funds for this program.

Kentucky recently passed the Local Government Economic Assistance Act (KRS 42.455) which provides an allocation formula for the coal severance tax collected by the state Department of Revenue on all coal produced in the state. Any funds in excess of $177.6 million are to be divided equally between the state and the local governments (i.e., counties and municipalities). Designated coal producing counties receive 90% of the local share and designated coal impact counties (i.e., those counties with no active mines but through which coal is transported) receive 10%. Approximately $200 million in coal severance tax is anticipated for fiscal year 1981-82. The Local Assistance Act establishes ten priority areas for these funds, including health, recreation, libraries, social services, government administration, economic development and vocational education.

Socioeconomic impacts on local communities in coal producing areas appear to be lessened to a certain extent through the Local Government Economic Assistance Fund provided by the coal severance tax. Therefore, it can be argued that existing state regulations adequately address socioeconomic impacts.

RECOMMENDATION:

An Areawide FONSI should be the recommended alternative for the socioeconomic resource area. Socioeconomic impacts associated with coal mining activities are adequately addressed through existing state regulations.

GEOLOGY

DESCRIPTION OF IMPACT:

Mining activities can produce adverse impacts if they occur on steep or unstable slopes or in areas with toxic overburden. Mining on steep or unstable slopes, slopes greater than 20 degrees, or lesser slopes that are underlain by bedrock of low bearing strength or other poor geotechnical quality, have a high probability of causing landslides. Such landslides can endanger public health and cause economic hardship to those affected by them.

The disturbance of overburden materials that are toxic or acidic and the exposure of such strata to water and the atmosphere can result in the formation of acid mine drainage and leaching problems. The lowering of the pH of rainwater and surface runoff can cause toxic substances in the overburden to be carried into the surface water system, causing adverse impacts to users of these water sources.

TECHNICAL ALTERNATIVES:

- Restrict certain mining practices or operations on steep and unstable slopes or relocate operations to other areas.
- Divert surface waters to avoid contact with toxic producing materials.
- Bury and reclaim spoil to prevent the formation of toxic runoff or seepage.

EXISTING REGULATIONS:

A number of provisions of SMCRA provide for the protection of existing geologic and soil characteristics and for the prohibition of mining on potentially hazardous areas (30 CFR 701.5; 716.2; 816.102; 816.116; 817.102; 817.116; and 826). The regulatory authority has the power to prohibit mining activities on areas with unstable geologic characteristics.

SMCRA requires coal operators to use the best control technology currently available to treat acid and other toxic mine drainage (Section 515(6)). Discharges from disturbed areas must ordinarily meet effluent standards established by OSM. Drainage from acid-forming and toxic-forming spoil into ground and surface waters is controlled by SMCRA regulations which are designed to protect the hydrologic balance (30 CFR 715.17(g) and 816.48). The regulations vest OSM with the power to judge when certain activities are detrimental to water quality and the surrounding environment (30 CFR 715.17(g) and 816.48). The Commonwealth of Kentucky establishes similar regulations for toxic overburden through mining regulations administered by the Kentucky Department for Natural Resources and Environmental Protection (405 KAR 1:150).

In summary, the requirements of the interim and permanent regulations of SMCRA, as well as state laws, are adequate to provide protection against the possible adverse impacts of mining on steep and unstable slopes and toxic overburden runoff and leaching.

ALTERNATIVES AND RECOMMENDATION:

Areawide FONSI - Impacts caused by mining and related activities on steep and unstable slopes or areas with toxic overburden can be significant and cause damage or loss of property and degrade water resources. However, the Kentucky and SMCRA regulations will mitigate possible significant impacts.

There is no reason to identify additional alternatives. EPA general or standard conditioning or individual reviews would result in a duplication of effort with no increase in environmental benefits. The Areawide EIA should state that there are no significant impacts in this area due to existing state and Federal regulations.

FLOODPLAINS

DESCRIPTION OF IMPACT:

Mining activities such as coal preparation plants, loadout facilities, and portions of surface mines may encroach upon floodplains and cause modifications to the hydrologic capacity of the stream that result in the back-up of flood waters upstream. Sediment which runs off mined lands can also reduce the flood carrying capacity of streams. When the same magnitude flood must cover a larger area due to the reduction in water carrying capacity of a stream channel, adverse economic and social impacts result from the property damage caused by the higher flood waters. The costs of these impacts are born by the persons and businesses affected by the flood and by the region as a whole due to reduced productivity and increased payments under the National Flood Insurance Program.

TECHNICAL ALTERNATIVES:

There are several alternatives available to mitigate this impact.

- Relocation - Mining facilities that are proposed to be located in the 100 year floodplain may be relocated to other sites in order to eliminate floodwater back-up.
- Design - Mining facilities can be designed so as to minimize the detainment of flood waters and eliminate inundation of upstream structures during floods.
- Exclusion - Mining facilities with the potential to cause damage of property and endanger human safety, and lacking relocation sites, should be prohibited.

EXISTING REGULATIONS:

Interim and permanent SMCRA regulations require a stream buffer zone of 100 feet, but do not specifically prohibit activity in the 100 year floodplain (30 CFR715.17 and 816.57). Kentucky regulations (KRS151) require a permit for construction of facilities in the 100 year floodplain of streams. This permit is not issued if engineering data indicates that the proposed construction will increase the existing flood height more than one foot, increase water velocities by more than one foot per second, or if structures upstream will be flooded. In order to avoid duplication of effort within KDNREP the Division of Permits, Bureau of Surface Mining Reclamation and Enforcement is charged with the floodplain review responsibilities for surface mining and the surface effects of deep mining (401 KAR4:040), using performance standards identical to those used by the Division of Water.

The KDNREP performance standards include provisions such as the following: proposed flood heights shall not increase more than one foot over existing flood heights, otherwise the application must be rejected (the HEC2 computer model is used to determine flood heights); velocities shall not be significantly increased (i.e. 1 fps); applicants must provide elevations on all homes within 1,000 feet of the proposed construction; upstream homes will not be flooded due to the proposed construction. It appears that adequate floodplain protection is provided by the State to reduce potential significant adverse impacts.

In accordance with Executive Order 11988, Floodplain Management, EPA is required to evaluate potential effects of its actions taken in a floodplain to avoid adverse effects due to the development of the resource. EPA's mandate to consider protection of floodplains is clear.

ALTERNATIVES:

Areawide FONSI - Impacts on floodplains caused by mining and related activities can be significant, resulting in damage or loss of property. The Kentucky regulations and review procedures regarding floodplain management should mitigate potential significant impacts as described above. Therefore, no significant impacts should remain with reliance on existing state regulations.

There is no reason to identify additional alternatives. EPA general or standard conditioning or individual reviews would result in a duplication of effort with no increase in enviromental benefits. The Areawide EIA should state that there are no significant impacts in this area due to existing Commonwealth regulations.

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